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REPORT ON THE DEVELOPMENT OF FUNDA-
MENTAL RELATIONSHIPS WITHIN INDUSTRY
IN THE UNITED STATES OF AMERICA



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REPORT on the development of fundamental relationships
within industry in the United States of America

as affected by

SCIENTIFIC MANAGEMENT,

by H. S. Person, Ph. D., Taylor Society, New-York.

INDUSTRIAL PSYCHOLOGY,

by W. V. Bingham, Ph. D., Personnel Research Federation, New-York.

EDUCATION AND INDUSTRY,

by C. R. Mann, Ph. D., American Council on Education, Washington.

PERSONNEL ADMINISTRATION,

by W. J. Donald, Ph. D., and Edith King Donald, American
Management Association, New-York.

LABOR MOVEMENT,

by Florence C. Thorne, American Federation of Labor, Washington.

SOCIAL AND ECONOMIC BACKGROUND,

by Glenn A. Bowers, Industrial Relations Counselors, Inc., New-York.

with a preceding summary by committee consisting of

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Glenn A. Bowers, Chairman.

SUMMARY OF REPORT BY COMMITTEE

LILLIAN M. GILBRETH, PH. D., MARY VAN KLEECK, GLENN A. BOWERS

In the United States of America the fundamental relationships of people in industry are rapidly changing and the influences responsible for these changes are many and complicated. They are so inextricably woven into the fabric of political, industrial and social life that it is bewildering to try to isolate any one. What are the most influential factors? How are they inter-related? What is the actual effect of each? No reasonable person pretends now to know. Yet the definite trends that are discernible are evidences of efforts to work out some sort of coherent system. In few instances do these efforts represent the concerted endeavor of all those interested. On the contrary, one of the conspicuous habits of the past which has been carried over into the present is that of regarding each phase of industrial relationships as a unit to be approached and dealt with separately. Frequently also those interested in one particular phase completely ignore the activities of other groups or even oppose them.

There are, however, in America indications of a desire to coordinate these group philosophies and activities, also of similarity of approach to outstanding problems. Already this spirit of consideration for all aspects of the total situation is of practical usefulness. In the preparation of this report the facilities of seven substantial organizations were immediately available. The historian of the future may possibly look back upon such cooperative projects, of which this is but one example, as the beginnings of a new viewpoint in the efforts to resolve conflicts in industry. Indeed, if there be one outstanding characteristic of labor relations in American industry in 1928, it is the approximate uniformity of philosophy and modus operandi of dominant groups. It is encouraging to note that organized and unorganized employers and employees are pinning their faith on constructive cooperation for the advancement of their respective group interests and are using similar and often identical language in voicing their aspirations.

In this brief summary of six papers only hasty reference can be made to some of the most important influences in American industry. The five factors in the development of fundamental

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relationships especially considered are those of primary interest to the I. R. I., namely:

**SCIENTIFIC MANAGEMENT,
EDUCATION,
INDUSTRIAL PSYCHOLOGY,
PERSONNEL ADMINISTRATION,
LABOR UNIONISM.**

These fields of interest inevitably overlap. The functions and tentative accomplishments of each of these will be treated here under the following six categories:

- I. THE WORKER AND HIS WORK.**
- II. THE WORKER AND HIS IMMEDIATE SUPERVISOR.**
- III. THE WORKER AND HIS FELLOW WORKERS.**
- IV. MANAGERS AND WORKERS.**
- V. OWNERS, MANAGERS, AND WORKERS.**
- VI. THE ENTIRE CIRCLE OF CONTACTS.**

In each of these six areas the above named factors have been influential in varying degree. As to present day objectives in industrial relationships, there is general agreement among the organizations representing the viewpoints of management, workers, and scientists which have cooperated in this report: public and private pronouncements of the several representative bodies include the following in various forms of expression:

I. THE WORKER AND HIS WORK.

Discover and present in concise form the requirements of the job.

Evaluate, insofar as possible, special abilities of the worker. Develop training facilities appropriate to the job.

Conserve the workers' energy through finding the easiest and most natural ways of doing the work, thus reducing fatigue. Increase the quality and quantity of output.

Provide fullest opportunity for growth, individual expression, initiative and advancement of the individual in proportion to his ability.

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Encourage workers' participation in improvement of methods and conditions of work and in the elimination of waste.
Compensate the individual in proportion to his special ability and contribution wherever practicable.

II. THE WORKER AND HIS IMMEDIATE SUPERVISOR.

Provide clear and definite instructions in work assignments.
Make the immediate supervisor a skilful instructor and an understanding helper of his men.
Assure the reasonableness of work requirements through the determination of a proper day's work.
Set up safeguards against the misuse of powers of supervisor over individual.
Develop and maintain the workers' appreciation of his share in responsibility for the product.

III. THE WORKER AND HIS FELLOW WORKERS.

Provide equality of opportunity and remove discrimination between individuals.
Develop an esprit de corps which will harmonize competing interests, real or imaginary, for the attainment of the common goal.
Preserve freedom of association of workers for the advancement and protection of special group interests.
Devise and preserve a wage plan which is equitable as between workers.

IV. MANAGERS AND WORKERS.

Share responsibility for the development of sound policies of administration.
Facilitate the association of workers for joint dealings with management through a predetermined orderly procedure.
Provide regularity of employment.
Pay the highest practicable wage consistent with enduring operation under existing competitive conditions.

V. OWNERS, MANAGERS, AND WORKERS.

Develop clear understanding of functions, rights, and responsibilities of these overlapping groups.

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Devise and maintain an orderly procedure for harmonizing the interests of each group.

Seek an equitable distribution of rewards among workers, management, and capital.

Yield earnings for employees which will permit a rising standard of living and the accumulation of adequate reserves for incapacity in old age.

VI. THE ENTIRE CIRCLE OF CONTACTS.

Combine in each producing unit the efforts of all persons associated with it for efficient output in quality and quantity.

Discover by methods of science how the requirements of industry and the capacities of men may be adjusted.

Coordinate the needs of industry and society through training and education.

Conduct the industrial enterprise that it may best serve the society of which it is a part.

Such are the goals of American industry. How is this master job being approached? What has been accomplished?

The methods used by various groups are again great in number and of wide variety. Foremost in the technique common to all groups is reliance upon "facts". In the search for facts about industry, regardless of the manner in which those facts are to be used, the methods of science are almost universally acclaimed. The amount of research into man's relation to work now under way in our universities is enormous. Industrialists, both managers and workers, are watching these experiments for the first glimmer of results and frequently undertake to apply them prematurely and without adequate preparation. Direct attempts are also being made by companies, manufacturers' associations, technical and professional bodies, trade unions, and the government to discover the meaning of current situations and to anticipate new developments.

Unquestionably this fever for research has resulted in important changes of method in certain sections of industry, in the creation and use of mechanical appliances, and in the develop-

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ment of new management procedures. Yet only a beginning has been made in the economical conservation and application of man-power. In this field great progress has been made in the reduction of accidents through the use of mechanical safeguards and awakened caution among workers. Two factors contributed to this end: accident compensation legislation and voluntary efforts of employers and employees in organized campaigns. Both of these approaches began about 1910.

Attention is now being turned toward similar reduction in the sickness hazard. The average loss per worker on account of sickness is between eight and nine days per year which is about seven times that due to accidents. The total loss from illness has been reliably estimated as \$2,000,000,000 per year.

The industrial loss due to irregularities in employment and to unemployment fluctuates, of course, with the state of industry. No adequate public statistics are available to determine its extent. A dozen relatively small employers have set up unemployment compensation plans for regular employees, while several unions of the needle trades have developed such plans under joint agreement with employers. Not more than 50,000 workers are covered by plans of this type.

Wastes due to strike or lockout are naturally the most spectacular. No national machinery exists for the avoidance or settlement of such conflicts, although the principle of arbitration is widely accepted and used. The conciliation service of the United States Department of Labor frequently exercises a potent influence in critical industrial disputes.

The application of man-power on the job also affords a vast area for improvement. In not many plants do conditions exist which permit the exercise of the workers' best sustained efforts. Failures in planning and routing materials and supplies and in providing working conditions and human relations of the right sort result in untold waste. In fact, rarely is a full day's work definable under present circumstances.

This brief recital of existing industrial wastes serves but to focus the problems for which employers, employees, and industrial scientists are seeking solutions. The most promising

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field of rapid development lies in the direction of better human relationships.

Present programs for solutions are of very recent origin. Scientific management as originated by Frederick Taylor has had the longest history among those here considered, yet it did not receive widespread attention until 1910. Industrial psychology, notwithstanding its twenty years of struggle, has not yet made a perceptible mark on American industry as a distinct science. Consciously planned personnel administration had its beginnings between 1910 and 1915 and after radical changes in basic notions has only now become a recognizable function of management. The readjustment of educational curricula to meet the needs of twentieth century industrial society is a post-war development, while the present changing policies of organized labor are as yet in an embryonic stage.

The methods of industry for improving the relations between the worker and his work are much the same in all groups. Discovery of the requirements of the job and the capacities of individuals calls for a technique in which there is little occasion for difference of opinion. Actual accomplishment in job specification already has been substantial in that practical pattern forms have been devised and are in daily use in large and small establishments. The extent to which these are applied throughout industry is, however, limited. The analysis of individual capacities is still in the experimental stage. Universities and colleges are developing many forms of objective testing and hundreds of thousands of individual case records, which will eventually permit comparison with life histories. Industry in general is skeptical of this attempt at appraisal of personal capacities. A generation of workers and managers will doubtless pass through industry before this tool is adequately developed and widely applied.

This experimentation is all aimed at securing freedom of opportunity that releases individual energy. Meanwhile the selection, placement, and promotion of the individual worker is being made through the use of expediency measures, often reasonably successful for present purposes.

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In this concentration on the worker and his work, the supervisor plays an essential part. Upon the worker and his immediate supervisor rests the responsibility for the work in process. The foreman is as powerful an influence for good or evil today as ever. In former times his methods were commonly unquestioned by his managing superiors. He hired and fired upon his own authority and was expected to get production in his own way. Several influences within the past two decades have been focused on the foreman and his job. The practice of basing decisions on facts serves to limit the range of his responsibility through the development of planning, scheduling, routing, stockroom orders, and other tools of scientific management.

The growth of trade unions and company employee representation plans at first curtailed the freedom of the foreman particularly in stating what he could not do. More recently, however, the tide has turned and the foreman is taking on a new kind of responsibility. He is now the key administrator through whom practically all personnel activities become effective. His authority is enhanced by providing him with more effective tools of administration. The workers' relations with the foreman have become more closely interrelated as a result of the more intelligent efforts at cooperation in efficient production.

The introduction of training programs is an aid to the foreman first by helping him to study his own task, second by placing more capable workmen on the job in shorter time, and third by teaching him how to train both new and older workers to work more effectively.

Relationships between the worker and his fellow worker are of three general types. Historically and even predominately today the worker is related to other workers only as an individual. In a sense each is a competitor for the job of his neighbor. Fortunately there have been enough jobs for all, except during intermittent periods of depression. Secondly, some 4,000,000 or more workers are associated in trade or industrial unions for the protection and advancement

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of their group interests. Thirdly, workers of many individual establishments are associated in the company or plant for direct organized contact with management. Perhaps 1,700,000 are under this form of joint relations. Within these latter two types there are many variations in form.

It is doubtful that scientific management, industrial psychology or education had any noteworthy influence upon the development of these particular group or joint relationships just mentioned. The labor union and the employee representation movements were rather sponsored respectively by employees and employers. Labor organized primarily to improve working conditions in backward industries. Employers subsequently devised company organizations of employees because they felt that the community of interest between the employees of a single company was greater than that between employees of a craft or industry; also because they did not like the outside control which ordinarily accompanies trade union recognition. Trade unionists maintain that this type of joint relations does not best serve the interests of workers because of inequality of bargaining power. They believe that the first requisite of any organization of workers is that it must be able to establish and maintain itself by economic force, if necessary.

Up to the war period labor unions had been engaged mainly in a struggle for recognition and the establishment of certain minimum standards. Some of the older unions which had already attained an accepted status had also shown an interest in and capacity for working with management to solve problems of operation. This was notably true in the share which the typographical union had in the introduction of the typesetting machine into the printing industry. But the struggle for recognition in most cases had been accompanied by bitter industrial strife and methods were used which were not a credit to either party. At least, there developed a distrust between union leaders and managers which precluded, for the time being, cooperation for constructive purposes. The desire for cooperation with employees in plans of repeated strikes and lockouts prompted certain employers to set up the new form of employee-employer relationship with the company or

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plant as the unit. The idea of cooperation had a magic appeal. Although cooperation did not always result from the new plan, employee representation on a company basis did serve to crystallize in American industry the function of cooperation between the parties immediately involved.

Principally as a result of war-time joint relations, but also as a natural evolution of thought, managers and owners came to accept the principle of collective bargaining. Some, however, refuse to limit this operation to dealings with unions and insisted that agreements arrived at with employees of a single company, frequently with arbitration provisions, also constitute collective bargaining. Whatever may be the correct view, it is certain that many of the company plans established or stimulated by employers could not be abandoned without a strike of the employees under it.

Thus changing relationships between the worker and his fellow-workers have brought about a new status individually and collectively between managers and workers. The post-war extension of this philosophy of cooperation has not been limited to any one group or any one type of joint relationship. A momentous development has taken place grounded on the principle that increased wages and standards of living can only be attained through efficient production. In company plans, employees have cooperated with management in the elimination of accident hazards, the reduction of scrap and other forms of waste, and to the making of suggestions under systems of reward. In certain unionized industries there has grown up union-management cooperation of a substantial sort. The employment of technicians and engineers as aids in this participation in management has been especially noteworthy. In this two-phased cooperative movement the ultimate goals sought by the trade unionists and the advocates of the company employee representation movement, as expressed by the leaders of these groups, are identical. Both want a prosperous industry which will pay high return in the form of wages, salaries and profits. Both believe that enduring prosperity will result only under conditions which free the creative abilities

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of all involved in the enterprise. Whatever may be the form of joint relations, the methods used by workers and managers cooperating constructively are of the same order and kind. Such methods include participation in planning, suggestions for improvement of methods and working conditions, conferences, and in the exercise of other functions and procedures involving judgment. Although the form of organization does not in itself induce or prevent the use of cooperative tactics, it is a vital factor when trade union recognition is questioned. In such cases the immediate goal of the workers is recognition. In fact, some observers have regarded the willingness of unions to cooperate primarily as a bid for further recognition.

Managers and workers are in this manner being drawn into a community of interests which have hitherto prevailed only to a limited degree. This has been enhanced somewhat by the changing relationships between owners, managers and workers. On the one hand owners and managers have become separate entities as the corporate stock form of industrial organization has taken the place of managing partnerships, while on the other hand the spread of capital ownership has made the employee a factor as an owner of securities. This new employee position is not confined solely to employee holdings of stock in the company for which he works, but includes also investments in savings banks, insurance policies and the potential business operations of trade unions. It is true that these evidences of employees as capitalists do not carry with them much direct power over industrial policies. Such power is being attained rather through the demonstration of ability to aid in determining policies in an increasing number of situations which permit it.

An important element in this changing economic status of workers is the present widely held theory that high wages enhance purchasing and that industry thus expanded yields increased rewards for all parties. It yet remains to be seen how long this theory will prevail in actual practice. Widespread unemployment or a general industrial depression would put the theory of high wages to a crucial test.

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It may be seen, therefore, that the manager and the worker are enhancing their positions in the triumvirate with capital and that the interdependence of the family circle - the entire circle of contacts is more clearly recognizable. In fact this philosophy of mutuality of interests, multiplicity of responsibility, and integration of purposes and methods appear to be the emerging ideal of American industry. However, if this be the goal it is yet a long way from accomplishment. The hopeful sign lies in the apparently narrowing area of conflict and the extension of the area of cooperation.

It would be extremely unwise to attribute to any one movement the blame or credit for the industrial relationships which exist in the United States today. There is plenty of stigma and glory for all. Each has had its influence, either in one direction or another. In some cases there has been unanimity of purpose and methods; in other instances there have been divergent viewpoints. Nevertheless, out of this mosaic the following outstanding accomplishments may be credited each to the movement which was dominant in seeking it.

SCIENTIFIC MANAGEMENT has contributed a new viewpoint and a new technique; it has laid the groundwork for the recognition of functional relationships in industry; and it has set up operating situations which develop habit patterns of understanding, cooperation and high productivity.

INDUSTRIAL PSYCHOLOGY has focused attention on the individual worker and his job; it has brought into the foreground mental processes and emotional reactions in industry as fields for scientific study.

EDUCATION is developing a basis for creating situations in which the individual will have maximum opportunity to do the work he is best fitted to do and his natural aptitudes will be given free range of expression through individualized training.

PERSONNEL ADMINISTRATION has demonstrated the importance of meeting personal needs of workers and adjusting them to the requirements of the individual producing unit; it has

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applied many of the tools of science without calling them scientific.

ORGANIZED LABOR has been a prime and potential factor in raising the standards of living of American workers; it has been a strong force in support of capitalistic industry, and is contributing substantially to the enlistment of workers' full efforts in production.

Finally, the existing relationships in industry have doubtless developed as they have in America because of influences that are more basic than, or at least precedent to, the five especially considered in this paper. For one hundred and fifty years Americans have been engaged in conquering a continent of vast natural resources under a political organization peculiarly their own. A philosophy of individualism clearly expressed in the early days of the republic has laid its imprint on industrial development. Only in this century has the doctrine of the priority of public interest come to be generally accepted, and even yet its application is far from general. Scientific management, industrial psychology, education, personnel administration, and the labor movement each represent conscious attempts to direct the development of fundamental relationships within industry in ways which will benefit all those concerned, whether immediately or remotely.

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The factors involved in the organization and co-ordination of specialized efforts for the accomplishment of a common purpose are numerous, variable and difficult of casual valuation. Too frequently policies, plans and procedures are based on individual authority, opinion or snap judgments, and consequently energies are misapplied, results disproportionate to efforts, rewards inequitably distributed, and human nature violated.

Scientific Management by the utilization of investigation and experiment seeks to eliminate superficial variables, discover the laws of each particular managerial situation and, through appropriate procedures, to substitute these laws for personal authority and opinions. It aims to economize energies, secure maximum rewards, make self-expression and self-respect realizable in every task, and generally to promote human welfare through harmonious co-operation in livelihood activities.

This involves primarily a state of mind towards managerial responsibility and a method of approach towards the solution of managerial problems; not the speedy installation of an inflexible system of procedures. It involves purpose, ideals, investigation, understanding, and prolonged and patient effort. It involves human sympathy and capacity for co-operation.

The capacities of organizations for the development of these characteristics vary greatly. Therefore scientific management varies greatly in both fundamental and superficial aspects as between different plants. There are few examples of complete development, but there are many instances of varying degrees of partial development, and American industry as a whole has been profoundly influenced by scientific management.

Scientific management has a number of objectives, according to the point of view from which it is examined. The following are outstanding: to make enterprise successful by good judgment in gauging the demand for the commodities or services to be produced and by economical application of the human and material energies involved; to make work agreeable in its physical conditions, human relations and the satisfaction of a job well done; and to promote human welfare by increasing productivity, improving distribution and raising the standard of living.

It was a practical human relations problem arising out of an effort to secure productivity that in 1880 stimulated Taylor, then an inexperienced boyish foreman, to those researches out of which scientific management developed.¹

At that date mechanization of American industry was under way, operations were becoming specialized, workers were more

¹ F. B. Copley, "Frederick W. Taylor", Vol. I, pp. 3, 157-189, 205-245.

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scattered throughout larger plants, experience with unemployment had generated a spirit of "make work", recent experience with the cutting of piece rates had caused distrust of management, voluntary effort was at a low state of efficiency, supervision had not adjusted itself to the new conditions, and generally morale and productivity were low. Advanced from worker to foreman, young Taylor not unnaturally imitated the bosses under whom he had worked and attempted to force production by driving the workers, which was the method of foremanship then customary.

A fight with the men resulted. Taylor won out, but the experience hurt what was a sensitive and sympathetic nature and disillusioned him. "I was a young man in years, but I give you my word I was a great deal older than I am now, what with the worry, meanness and contemptibleness of the whole damn thing", he said years later; "I made up my mind either to get out.... or to find some remedy for this unbearable condition." ²

The youthful foreman did some hard thinking and decided that management was chiefly at fault. Throughout American industry its only concept of a proper day's work was what it could drive workers to do. But it is management's business to know what is a proper day's work. The only way to know is by research and experiment. Thereupon Taylor secured permission to conduct "some experiments", the purpose of which he kept to himself. He did not think they would take over six months, but they continued more than twenty-five years. Almost immediately, however, they yielded results in the nature of measured possibilities of work which put supervision and management in that shop on a factual basis. Output was planned, controlled and increased under conditions agreeable to the workers. Never again did Taylor have controversy with workers under his supervision, and never have any of those who have followed his methods faithfully.

The body of procedures which grew gradually out of these investigations and experiments came to be known as "The Taylor System", and to the doctrine and principles later

² Copley, *Op. cit.*, p. 5.

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derived from these procedures were given the name "Scientific Management".³

Scientific management, says Taylor, is primarily a mental attitude towards work, and only secondarily a system of practices. "The essence of scientific management consists in the application of certain broad general principles, and the particular way in which these principles are applied is a matter of entirely subordinate detail.... there is not one who uses the same methods in any two successive establishments", he wrote to a friend.⁴ Briefly, this mental attitude involves "the substitution of exact scientific investigation and knowledge for the old individual judgment or opinion, either of the workman or the boss;"⁵ and "the substitution of peace for war,of hearty brotherly cooperation for contention and strife; of both pulling hard in the same direction instead of pulling apart; of replacing suspicious watchfulness with mutual confidence."⁶

But the manner in which a mental attitude expresses itself in conduct is hardly less important than the attitude. Although the practices of scientific management may vary according to their adaptation to particular circumstances, nevertheless, if the attitude is definite and consistent, there must be a permanent nucleus of practice which reflects the consistent attitude. Considering both mental attitude and practice, and looking back from 1928 over forty-eight years of its development, scientific management may be restated as involving:

The discovery by investigation and experiment of a factual basis for every determination of policy, program, product, material, machine, tool and method in the operation of an enterprise;

A system of control of operations, in terms of standards determined by the research and experiment, which brings

³ The term "Scientific Management" was adopted by a group of engineers called in conference late in 1910 by Louis D. Brandeis, then an attorney for the shippers in the Eastern Rate Case hearings, now an Associate Justice of the Supreme Court of the United States.

⁴ Copley, *Op. Cit.*, Vol. II, p. 309.

⁵ *Ibid.* Vol. I, p. 12.

⁶ *Ibid.* Vol. I, p. 11.

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individual specialized efforts into coordination with the result of a minimum expenditure of the human and material energies involved;

Both research and procedures which, although in design and application chiefly the work of specialists, must be open, reasonable, just, acceptable to all individuals concerned, and expressive of a common purpose and good-will. ⁷

It is obvious to one experienced in human affairs, and particularly in enterprises in which many types of individuality must join in common effort, that here is not an inflexible system of procedures which can be bought and installed like a boiler or a loom; that on the contrary here is something of an organic nature which, although conceived and guided by an outstanding leadership, grows out of a harmony of desires and understandings within the group. That is one reason why there are so few complete developments of scientific management, even though American industry generally has been profoundly influenced by its spirit and has come to utilize many of its mechanisms. On the one hand there are too few managers of vision, leadership and energy who do not require the compulsion of circumstances to undertake the patient development of something new; on the other hand, because of natural basic conditions of prosperity there has not been any general serious urge towards ideals and methods marking a radical departure from opportunism. The urge for a consistent and well-rounded development of scientific management, as distinguished from unconscious influence of its spirit and conscious appropriation of some of its waste-saving mechanisms, has been felt chiefly by those rare leaders who are capable of response to ideals of perfection in technical accomplishment and in human relations.

Another reason is that the American executive has not taken to doctrines, theories or systems. A doctrine or a system consists of an integrated group of detail beliefs or practices,

⁷ For a picture of an outstanding case of scientific management, see the description of Kendall Mills Incorporated, a group of seven cotton textile plants, in Bulletin of the Taylor Society, Vol. XII, No. 6. December 1927.

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many of which may be held or practised by individuals who do not accept or even are not informed concerning the doctrine or the system as a whole. The American industrialist has lived in a period of opportunism, has been concerned chiefly with dynamic problems of frontier industry, and has been engaged in doing things rather than in reading and thinking about things. Doctrines and systems do not excite his interest; in fact, a new doctrine or system is likely at first to invite rejection without serious consideration, although in time it may have great influence if it has integrity and vigor. The planning room, for instance, is now common in American plants, and the concept of high wages and low labor costs now has considerable vogue; yet many do not know that the mechanism came from Taylor, and that in the introduction to "Shop Management" he said: "This book is written mainly with the object of advocating high wages and low labor cost as the foundation of the best management".

Appraisal of the influence of a movement is a matter of historical research, analysis and judgment. One who searches the literature of American management since its beginning will find abundant evidence that the aims, principles and procedures first presented by Taylor have, like the ripples of a stone cast into a pool, spread out into American industry, although many a management of 1928 may not know the source of that which it believes or practises.

In addition to such direct and indirect influence of scientific management, it should be noted that its influence has been enlarged and extended by supplementary forces of independent origin. Those who have made research and experiment the basis of the pursuit of their special interest in management — whether in human relations, merchandising or general administration — have found themselves developing techniques and expressing philosophies essentially identical with the technique and philosophy expressed by Taylor nearly half a century ago. Even the very recent developments of psychology in the field of management are more closely related to Taylor's early empirical studies of fatigue in shoveling, handling pig iron and inspecting balls for ball bearings, than to the intro-

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spective psychology which was contemporary with Taylor. He had a vision of such things. Asked why he had not turned attention to scientific management in other phases of management than production, he replied that life was too short, that the best he could do was to make a thorough demonstration in the field of production management, leaving to others the problem of carrying the development into other fields.⁸

The phenomena of mechanization and mass production, so characteristic of American industry during the past quarter century, and so economical in the production of large quantities of identical items, should not be confused with scientific management. Scientific management and mass production may coincide, but they are not the same thing. Where they are found together the results are noteworthy; but frequently where mass production and a high degree of mechanization dominate a scene, scientific management is not found. Mass production has its origin in large markets, a huge volume of orders, standardized products, and the possibility of economical fabrication by means of a steady flow of materials through single-purpose machines and highly specialized workers; and these factors are not infrequently accompanied by some degree of monopoly advantage. If such is the case - and there are such cases - the enterprise may be highly successful by pursuing lines of least resistance which do not include scientific management.

In contrast to mass production, scientific management had its origin in and is to be found today chiefly in small and medium sized plants making variable items, or standard items variable as to detail characteristics, on multiple-purpose machines which require human regulation and attention as work varies. While mass production makes its gains almost entirely by the economies of a ceaseless flow of material through specialized machines, scientific management makes its gains chiefly by eliminating the wastes of misapplied human effort, misused materials, and lack of coordination of efforts where variability is present. Both mass production and scientific management use equipment which is scientifically designed; but scientific

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management is a management which is itself scientifically designed. Management is necessarily a matter of study and design in plants making variable products in varying volume on variable machines, for in such plants numerous wastes of maladjustment are possible.

In the United States there is great variety as to size of plants, nature of the processing - continuous, intermittent or variable - and as to the kind and quality of management. The numerical proportion of large mass production establishments is small, but the proportion of workers which they employ and their output is enormous. Some have been strongly influenced by scientific management, some moderately and some very little. There is a very considerable proportion of medium sized plants some of which may have continuous processing in one or more departments, although they would not be classified as mass production establishments. These also have been influenced more or less by scientific management. The dominant proportion of establishments - chiefly, although not altogether, of small size - have managements representing inherited patterns modified by casual imitation. Among all of these classes can be found only a small handful of well-rounded developments of scientific management.*

The large class of plants dominated by tradition and imitation has naturally appropriated some of the mechanisms of scientific management, and although the net result has been a gradual raising of the level of management in such plants, this result has not been achieved in all cases. Very serious damage in individual instances to managerial efficiency and harmonious relations with workers, and to the good repute of scientific management, has resulted from failure to adopt ideals and spirit along with mechanisms. It is in this class of plants that the superficial "efficiency engineer" has found his clientèle, and as he has not hesitated to seek the advantage of proclaim-

* The literature of management has so featured interesting cases of mass production that many students in other countries than the United States have received the impression that American industry is made up of "Fords". The following data will be enlightening. Of establishments having an annual product of more than \$5000, the distribution in 1925 was as follows (Statistical Abstract of the United States, 1925):

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ing himself a representative of scientific management, the harm he has been able to bring temporarily to scientific management has been considerable. But American managements are becoming more discerning, discriminating and cautious, and the baneful influence of the "efficiency engineer" appears to be declining.

The concern of scientific management for harmonious industrial relations, and workers' prosperity and goodwill, has always been deep, for one of the first discoveries of research in management is that goodwill is a productive power independently of the efficiency of the equipment and method, and adds to the efficiency of the equipment and method. But scientific management considers workers' welfare and goodwill, not as something which can be generated effectively as a thing apart from the spirit and methods of management, but as something which is dependent on and a consequence of these. Good management and workers' welfare are the two terms of an equation; it matters little which term is put first.

The lines are many along which scientific management contributes to workers' welfare and goodwill, and to harmonious industrial relations. The entire list enumerated below can

Classes by Value of Product	Per cent of Establishments	Per cent of Workers	Per cent of Total Product
\$ 1,000,000 and over *	5.6	56.8	67.6
\$ 500,000 to \$ 1,000,000	5.2	13.5	11.0
\$ 100,000 to \$ 500,000	22.5	20.0	15.3
\$ 20,000 to \$ 100,000	36.8	7.9	5.2
\$ 5,000 to \$ 20,000	29.8	1.9	1.0

And from the United States Census of 1919:

Classes by Number of Wage Earners	Per cent of Establishments	Per cent of Workers
1 to 5 wage earners	56.2	3.3
6 to 20 wage earners	22.2	6.8
21 to 50 wage earners	10.0	8.9
51 to 100 wage earners	4.9	9.6
101 to 250 wage earners	3.9	17.3
251 to 500 wage earners	1.4	13.7
501 to 1000 wage earners	0.6	13.2
Over 1000 wage earners *	0.4	26.2

* The enterprises which an American would classify as representative of mass production are to be found in the upper strata of those classes identified by an asterisk.

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be achieved only by a management of superlative vision, understanding and leadership ability, yet the total group of items in the list is true of a particular enterprise which the author has in mind, and other enterprises have achieved a greater or less proportion of these items, according to the capacity for leadership and cooperation present in both the management and the workers in particular instances. Scientific management aims:

To gauge industrial tendencies and the market,¹⁰ in order thereby to regularize operations in a manner which will conserve the investment, sustain the enterprise as an employing agency and assure continuous operation and employment.

To assure the employee not only continuous operating and employment by a correct gauging of the market, but also to assure by planned and balanced operations a continuous earning opportunity while on the payroll.

To earn, through a waste-saving management and processing technique, a larger income from a given expenditure of human and material energies, which shall be shared by workers and management. Scientific management plants generally pay wages above the market.

To make possible a higher standard of living as a result of increased income to workers.

To assure a happier home and social life to workers through removal, by increase of income, of many of the disagreeable and worrying factors in the total situation.¹¹

To assure healthful as well as individually and socially agreeable conditions of work.

To assure the highest opportunity for individual capacity

¹⁰ Where there are huge investments of capital in fixed and specialized form this may mean a consideration of social desirability, or long-run fundamental usefulness, as bearing on long-run demand.

¹¹ Says one exponent of scientific management concerning his group of seven mills; "while not unmindful of the importance of stability that is coupled with material success, their interest is quite as much in producing better citizens as in securing profits." *Bulletin of the Taylor Society*, Vol. XII, No. 6, p. 525.

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through scientific methods of work analysis and of selection, training, assignment, transfer and promotion of workers.

To assure by training and instructional foremanship the opportunity for workers to develop new and higher capacities, and eligibility for promotion to higher positions.

To develop self-confidence and self-respect among workers through the opportunity afforded for understanding of one's own work specifically, and of plans and methods of work generally.

To develop self-expression and self-realization among workers through the stimulative influence of an atmosphere of research and valuation, through understanding of plans and methods, and through the freedom of horizontal as well as vertical contacts afforded by functional organization.

To eliminate factors of the environment which are irritating and the causes of frictions, and to promote common understandings, tolerances, and the spirit of team work.

These aims - some of them results of early experience with scientific management which have been adopted as the aims of subsequent activity - have not been achieved with equal success in all scientific management plants, and are not the exclusive possession of that small group of plants which may properly be classified as representatives of scientific management. But the literature of scientific management reveals that these have consistently been its aims; most of them from the beginning of the movement, and others as experience has disclosed their importance and practicability. Scientific management has always been characterized as progressive in its concepts of the solution of the problems of industrial relations. Investigation and comparison of plants reveal that generally the more complete the development of a technique of scientific management, the more completely are these aims represented in policy and procedures, and the more favorable the response of workers. The reason for this correlation is not difficult to understand. Scientific management seeks, and the more completely it is developed in a plant, realizes a stability of conditions and sureness and economy of effort

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which are impossible without the goodwill and cooperation of the workers. The achievement of the goodwill and cooperation of the workers has consistently been an objective and has never been a problem for scientific management plants.

Entirely distinct from the reactions of workers employed in scientific management plants, and chiefly representing the reactions to scientific management as a theory on the part of organizations of labor not strongly represented in such plants, was the opposition of nationally organized labor for a period of about six or seven years prior to the war. This opposition fortunately has practically disappeared and can be analyzed as are other historic events.

Scientific management came to public attention in the United States through certain hearings before the Interstate Commerce Commission in the winter of 1910-1911. Newspapers and magazines discovered its news value and deluged the public with articles concerning it. And although organized labor had given it no attention during the first thirty years of its slow development, now that the public was becoming interested, labor also became interested. It analyzed scientific management as a doctrine and found grounds for opposition. These grounds were not unreasonable inferences from the inadequate early expositions of scientific management. The reasons for opposition, some declared and some not declared, may be reduced to four:

Organized labor had had a long and hard struggle to achieve status in the face of strong opposition of industry, and its natural and not unreasonable assumption was that anything new originating in management and by management was for ownership's advantage and presumably to labor's disadvantage.

Assertions concerning the development of a "science for each operation" and the reductions of operating methods to easily understood instructions, caused a fear of the loss to labor of craft distinctions and of the power of labor in the possession of craft knowledge and skill.

Numerous statements concerning economies which had been

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effected by scientific management, especially in the nature of labor saving, called up at once the instinctive fear that a general adoption of scientific management would cause widespread discharges and unemployment.

Inadequate explanations of the use and limitations of time study and of reasons for increase of productivity, led to an assumption that scientific management means a speeding up, wearing out and eventual casting aside of the individual worker.

In view of the atmosphere of distrust between industry and organized labor at that time, these arguments of opposition were not unnatural. They were assumptions and were wrong. The replies to them were based on experience, but an experience not documented, and were unconvincing. There was no solution for the controversy in argumentation, and labor was not disposed to investigate the facts. From the point of view of the historian in 1928, it was necessary for the course of events to bring its own enlightenment through larger experience. That is what has come to pass.

The first ground of opposition disappeared during the war. Employers and leaders of organized labor laid aside their differences as they worked side by side on war committees. They learned to understand each other better as human beings and to value each others' motives. And organized labor observed that the scientific management group was the most consistent of all employing groups in regarding and promoting labor's interests and in the desire to conserve labor's gains after the war.

The second ground of opposition disappeared through gradual observation of the facts. A "science for each operation" does not destroy craft skill; it may modify its content sometimes, but it as frequently gives it wider scope. Labor has observed also that the procedures of scientific management require in addition to old skills, a skill in cooperation through understanding of purpose and methods. A scientific management plant strives to bring all workers in a craft to the level of skill of the best, and is more dependent on uniformly high

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intelligence and skill within a craft than any other kind of plant.

The third ground of opposition also disappeared through observation of facts. Labor saving through better management, as distinct from labor saving by an occasional epoch-making invention, although easily described, takes research, education and time to achieve. One can tell in one minute about a saving of labor energy which has taken a year or more. Savings are generally by small increments through a long period, and adjustments are effected during the period. The rate of saving rarely amounts to the normal rate of voluntary quits.¹² Scientific management may involve reassignments — and for the first time in the life of many workers assignments on the basis of investigated capacity — but it does not often involve discharge.

The fourth ground of opposition also gradually disappeared with experience. Improvement and standardization of machine conditions and of methods may or may not result in increased speed of production, and with or without increased speed of the operative; it depends upon the particular machine, the particular operation and the particular circumstances. It should be borne in mind that machines and operations vary greatly in the relation of workers' handling time to machine time, and that the problem of speed and of fatigue varies accordingly. In operating a punch press, for instance, the worker is active all the time, fatigue becomes an important element of the situation, and experiment may disclose that a reduction of speed or introduction of rest periods will increase productivity; but in the operation of a large lathe the worker is but a watcher and adjuster for a major portion of his time, and increase in the speed of the machine has only remote fatigue relation to the worker. And in many instances the increase of speed is merely a mathematical result of dividing the total output into the total time taken and securing an average time per piece; for when conditions are improved so

¹² The December 1927 report of the Metropolitan Life Insurance Company, New York, of the average annual voluntary quit rate of more than 300 reporting companies is 14.9 per cent.

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as to eliminate waiting and other idle time, the average time per piece may be reduced without any increase of actual speed. It has come to be understood that speed and fatigue are problems of each particular operation, and the more carefully a correct speed is sought by experiment and measurement, the more reasonable, just and permanent will be the standard of output agreed upon.

It is the judgment of many observers that the tempo of machine work is higher in the United States than in Europe. There have been no researches into the relation of speed to particular systems of management, particular methods of wage payment or particular industries. Competent observers report that it is apparently highest in extremely mechanized mass-production plants, and that tension appears to be least in scientific management plants.

The opposition of leaders of labor to bona fide scientific management has practically disappeared, and during recent years there has been noteworthy cooperation between scientific management leaders and labor leaders.

The first striking evidence of labor's interest in good management and increased productivity was the association in 1920 as editors of a volume entitled "Labor Management and Production",¹³ of Samuel Gompers, President of the American Federation of Labor, Morris L. Cooke, an outstanding disciple of Taylor, and Fred. J. Miller, President of the American Society of Mechanical Engineers and an exponent of scientific management. A few years later other labor leaders contributed to a similar volume.¹⁴ In December 1925, William Green, successor to Gompers as President of the American Federation of Labor, participated by a noteworthy address in a meeting of the Taylor Society,¹⁵ and a few months later other representatives of labor participated in another meeting of that society.¹⁶ In the spring of 1927 the General Labor Union of

¹³ Annals of the American Academy of Political and Social Science, Vol. XCI, September, 1920.

¹⁴ Ibid., CXI, January, 1924.

¹⁵ Bulletin of the Taylor Society, Vol. X, No. 6, December, 1925.

¹⁶ Ibid, Vol. XI, No. 1, February, 1926.

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Philadelphia had a two-day conference on cooperation between management and labor in the development of better methods of production, in which scientific management was sympathetically discussed and scientific management engineers and executives were active participants. This led to other similar conferences under the auspices of organized labor. In the Cleveland, Ohio ladies' garment market, organized employers and organized workers have agreed upon a program involving measured standards of output, and the stop watch is the accepted instrument of measurement. On the Baltimore and Ohio, the Canadian National and two other railroads there is organized cooperation between management and workers in the development of better methods and the workers have on their payroll an engineer concerned with improvement of methods.

Misunderstandings and disagreements concerning scientific management as a doctrine have given place to cooperative inquiry into conditions and methods of its utilization.

Scientific management had its origin nearly fifty years ago in an inspired effort to solve serious problems of productivity and personal relations in a capitalistic regime of industry already becoming highly mechanized. It has become a philosophy and a body of practices pertaining to management *per se*, independent of any particular regime of industry, and usable in whatever system of industrial society men and women may desire to work together in specialized cooperative efforts toward a common objective. And because it endeavors to base policies, plans and procedures on scientifically determined facts of human nature as well as of mechanics, it is a great force for amelioration of human relations in industry.

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Influences limiting the progress of industrial psychology in the United States have been: the backwardness of the science itself; the demand for services of psychologists in other directions, notably in education; and the tradition among psychologists that many questions of industrial psychology are the exclusive prerogative of the management engineer.

Psychological problems have been recognized in connection with the individual worker's relations to his work, his fellow-workers, his supervisor, the management, and the entire circle of contacts outside the factory. The social psychology of relations between groups, of workers, managers and public, is no less important. These industrial relations have been influenced in three ways: by psychology as science, as point of view, and as method.

Facts about the nature of individual differences, the specificity of abilities, and the laws of learning, of interest and attention, have modified industrial practice. Use of statistical techniques is spreading, but controlled experiment has been sadly neglected.

In conclusion, mention is made of agencies for furthering industrial psychology in America.

In what directions and to what extent has the science of psychology influenced industrial thought and practice in the United States? What trends have been discernible during the past twenty years? What influences have operated to bring industrial problems into the purview of psychologists, and to bring psychological doctrines to bear on the thinking and practice of business executives, industrial engineers, labor managers, trade-union leaders, and students of social science whose primary interest centers in industrial relations? How keenly are the masters of American industry aware of the profound problems of individual and social psychology that have been brought into the spot-light of inquiry as a result of mass-production and minute division of labor, with the resulting tendencies toward repetitive processes, shorter hours, better wages, modification of many skilled trades, demand for highly specialized, non-transferable skills, and decreased need of mere physical strength in the worker? What help have the practitioners of scientific management or the administrators of personnel policies received from the science of psychology?

No damage will be done through frank admission at the outset that the significant and constructive contributions of industrial

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psychology in America have been pretty meagre. Psychology is a rapidly growing but still youthful science. It has been absorbed in the task of putting its own house in order. Within the past generation it has had to win the co-operation and respect of its elder sisters, the biological sciences. New techniques of research have had to be devised, new hypotheses formulated and put to the acid test of controlled experiment. Efforts in these directions have met with such success that there has been a wholly unprecedented and disproportionate demand for the services of psychologists as instructors in university and college courses in psychology. Then, too, the applications of psychology to problems of elementary and secondary education have absorbed a large share of the energies of the most brilliant of American psychologists. One need only mention the names of such leaders of psychological research as Thorndike, Terman, Judd, and G. Stanley Hall, to illustrate the force of the contention that careers in educational psychology have attracted some of our ablest men. And today, if industry is to bring it to pass that the attention of eminent psychologists shall be focussed on the problems of human relations and conditions in factories and offices, it must be prepared to compete not only with the instructional budgets of the universities and the considerable financial rewards that accrue, through publication, to those who greatly improve the techniques of public education; it must compete as well with enticing research opportunities now opening up to the psychologists on problems arising in the fields of political science, law, criminology, child guidance, and social betterment.

Not only have psychologists been under pressure to bend their efforts toward non-industrial problems: they have been content to see large areas of psychological inquiry in industry pre-empted by capable investigators whose training has been primarily other than that of the psychological laboratory. Many of the best contributions to the study of industrial fatigue, accidents, illumination, and simplification of work, have been made not by psychologists but by industrial engineers and specialists in scientific management. A canvass

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of the contributions of Frederick W. Taylor and his associates, for example, reveals numerous studies in the subject-matter of industrial psychology. Hence an unwarranted tradition has prevailed, to the effect that questions of time- and motion-study, incentives, factory training, and the design of tools, machines, benches and chairs to fit the requirements of the worker, are exclusive prerogatives of the engineer. Theoretically it has been recognized that each of these subjects has its psychological aspects, to which it might be presumed that a psychologist could contribute. Practically, the management engineer has known these problems so much more intimately in their industrial setting, that the psychologist unversed in factory practice has for the most part preferred to turn his energies in other directions. Indeed, it may be confessed that certain timid forays by amateur industrial psychologists into this territory have been ludicrous enough in their outcome to lend emphasis to this unfortunate tradition.¹ But enough by way of apology and explanation. What benefits, if any, have accrued to industrial relations in America because of the work of psychologists?

Some of these benefits we shall find are broad and general. Some are specific and detailed. They can best be envisaged after we have listed the chief industrial problems which are primarily psychological or which present psychological aspects.

PSYCHOLOGICAL PROBLEMS OF INDUSTRY.

Psychology is variously described as the positive science of conduct, the science of behavior, the science of experience. Whatever the limitation of scope implied in any such definition, the fact is that one finds today in any systematic volume on psychology, a wealth of fact and generalization with respect

¹ Industrial executives must share in part the responsibility for these fiascos. Over and over again they have engaged as psychologist a novice whose only claim to the title was that he had studied a few elementary courses in college, or perhaps had been an assistant in routine psychometric work in the Army or in a child guidance clinic. One cannot help smiling at such choices, made by business men who would never for a moment think of dumping a complicated problem of mechanical development or chemical research on the shoulders of an inexperienced or half-trained engineer.

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to human nature. Those problems of industry may be considered psychological which involve questions of human nature.

Foremost are the problems which have to do with the worker in relation to his work. Many such problems arise in helping the worker find the simplest, easiest, most natural ways of doing his work; conserving his energy; reducing fatigue; increasing quality and quantity of output; eliminating personal injuries and lost time due to accidents; removing unnecessary fears and irritations connected with the work; reducing unrest, discontent and dissatisfaction with the job and with the working conditions surrounding it; and increasing the laborer's store of contentment, pride and satisfaction in his accomplishment. These are all basic practical problems of industrial management, most of them capable of at least partial solution through the application of shrewdness and common sense, but all of them offering a challenge to the psychologist to apply his science, and to supplement common sense by analysis, objective measurement and experimentation, very much as he has done in the public schools, in greatly shortening the time required by a boy to complete the job of learning how to read and to compute. Common observation of the behavior of workers engaged in heavy labor or in work requiring close attention, might well have suggested to any sensible supervisor the economy of insisting upon appropriate, properly spaced rest periods; but the fact is that this device has rarely been employed except where science and controlled experiment have first demonstrated its worth and indicated the optimal distribution of rests for the particular tasks in hand. Scarcely more than a good beginning has been made in the scientific understanding of rest periods in relation to fatigue, monotony, workers' reveries, outbursts of temper and radicalism. Here, as in a thousand other aspects of the job in its relation to the individuality of the worker, the psychologist has significant opportunities for industrial application of his science.

A second group of psychological problems arises out of the relations between a worker and his fellow-

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workers. How to harness the impulse to competition, and insure a healthy rivalry for high quality of output or freedom from accidents; how to eliminate the conflicts, irritations and jealousies which sometimes clog the human machinery of the factory; how to prevent loss of working time in idle banter while supplying on appropriate occasions ample opportunities for good fellowship - these are questions which are ordinarily left to chance or to common sense. More basic is the best means of developing a substantial group solidarity, a ready helpfulness, a willingness of the experienced workers to take the new employees in hand and teach them the practices and ideals of the shop. Then, too, workers sometimes tend to teach each other various fears and notions leading to conscious restriction of output. They may spread an apprehension of lay-off or of piece-rate cutting, when no genuine basis for it exists in reality. Here the problem arises as to how such unwholesome influences of workers on one another can be minimized, or replaced by influences which make for better mutual education and cooperation. These are complicated problems of practical social psychology.

Yet a third group of problems centers in the relations of the worker and his immediate supervisor. These relations may be harmonized by making sure of the reasonableness of the work requirements; by making work assignments and instructions clear and definite; by introducing an equitable routine procedure of distributing work and materials, to do away with the possibility of partiality or favoritism in these regards; and by making the supervisor a skillful instructor and an understanding helper of his men, as well as a fair and just disciplinarian. The psychological aspects of these processes are sufficiently obvious.

No less psychological in essence are many of the problems arising out of the worker's relations to the management. Consider, for example, the assurance of steady employment. This has often been made possible through improved market analyses, business forecasting and careful scheduling of production. The effect produced on the worker by relief from the overshadowing fear of lay-off is a psy-

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chological fact of major importance. So, too, with many questions of wage rates, methods of payment, and policies regarding stock-ownership, insurance, pensions, housing, loans, vacations, facilities for education and recreation, and the like. The adequacy of the machinery provided for the airing and prompt adjustment of grievances reflects the management's grasp of practical industrial psychology. The same may be said of its success in providing suitable recognition of merit and competence, not so much through resort to non-financial rewards and recognition, (although these have their value and are often prized), but rather through proper payment by results, and adequate provision for advancement. Many economists are prompt to insist today that the problem of wages has its psychological aspects.

Group relations of workers and management have presented continuing problems whose psychological aspects are sometimes almost as perplexing as their more obvious economic phases. The reader need only remind himself of the misunderstandings, the mutual suspicions, the conflicting preconceptions and unyielding prejudices which too often have beclouded the thinking of workers' representatives and employers alike, when collective vs. individual bargaining, trade-union vs. shop committee organization and similar issues of joint relations have been brought forward.

Both parties have at times resorted to espionage in their fact-finding, a practice as unsound in its psychology as in its ethics. Both have been prone to color their inquiries with preconceived conclusions. Better methods of ascertaining the truth about actual and imaginary grievances, and the purposes and practices of employer and employee alike, will tend to bring about more wholesome industrial relations. The duty of undertaking to improve these techniques of fact-finding is one which the psychologist must not hesitate to accept. Already J. D. Houser, B. V. Moore and L. L. Thurstone have made a promising start in this direction.

The psychology of leadership requires clarification. It is not implied that there is any need for more argument or pooling of opinion as to the personal qualities which make

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for effective leadership within the ranks of labor or of management. What the psychologist demands is first of all a new, minute, comprehensive description and analysis of what the real, successful industrial leaders do. When this factual foundation has been properly laid, the drafting of better plans for discovering and developing the leaders of the future will not seem so complicated. Provision of opportunity and reward for exercise of constructive leadership and originality by workers and executives of whatever status, will probably then seem a most natural policy. If the channels are open for the flow of ideas and ability from one department or level of the organization to another, if real leadership wherever revealed is given its chance, both individual and group relations may be expected to benefit.

Relations of workers and management are already profiting from the studies which psychologists and educators have made regarding the development of leaders. Consider the function of an executive as a trainer of men. Studies of the techniques of teaching particular skills, habits, attitudes and items of essential information have led to many generalizations with reference to the processes of training. Excellent methods have been evolved for making the necessary preliminary analyses of the work to be done, the difficulties encountered, the items to be taught. Procedures have been developed for determining the content and outlining the successive steps in a training program. Practicable techniques for giving preliminary instruction and for training on the job have been evolved. Investigations have even been made as to the difficulties met in getting executives themselves to learn and to use these improved techniques of teaching their subordinates, and as to the best ways of overcoming these difficulties. In such ways the methods of research are being profitably applied to the educational problems of industry and business. As the results of these researches gradually find their way into the practice of supervisors and executives, the relations of workers and management cannot fail to profit thereby.

One now hears more than formerly about the psychological importance to industry of yet another group of relations, those of

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the worker to his family and, indeed, to the entire circle of contacts outside as well as inside the factory gate. Psychologists with a psychiatric background have been properly reminding management that careless accidents, temper, trouble-making, insubordination, absenteeism and other sorts of objectionable behavior often have their roots in worries traceable to conditions far from the immediate setting. The magnification of these worries during periods of excessive fatigue has been demonstrated. Attention has been called to the damage suffered by certain temperaments as a result of pessimistic reverie during the course of long-continued monotony. One obvious implication is, that a sound industrial psychology must reckon not only with the temperamental differences between workers and their relative susceptibility to the effects of different sorts of repetitive or taxing labor; it must know not only the conditions in the plant predisposing to monotony or fatigue; it must realize also the influence of the varied conditions that modify the employee's anxieties and hopes, his fatigue and recuperation, both during and after working hours.

But it is one thing to recognize the importance of the total situation in determining a worker's inner feelings and outward behavior, and quite another matter to infer that, therefore, wise personnel practice will seek to inquire into intimate personal and private circumstances in order better to be able to help make suitable adjustments. There must be no trespass on the worker's independence and self-respect. It is a neat problem of practical psychology, how to mould conditions so as to effect a maximum of well-justified contentment and willing efficiency, without risk of wrecking the whole morale through resentment against uninvited paternalism. Mr. Ford marched up this hill, and then marched down again. The practical solution reached by some executives has been to leave with the workers themselves the opportunity for initiative in such matters, and for management to stand ready to move only when, as, and if needed and invited so to do.

The psychological problems of industry have been surveyed as they present themselves to the student of the worker in his relations to his job, to his fellow workers, to his immediate

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supervisor, and to the management of the industry in which he is engaged. Not only his relations as an individual employee have been considered, but also his relations as a member of a group which, as a group, has vitally important relations both with the management of the particular concern which gives him employment and with the industry as a whole.

While there is little doubt that the most varied and intriguing psychological problems arise in studying the worker in relation to his own work, there is no question but what the psychological aspects of the situation are of vital importance in considering each of these other relations also. It is now appropriate to ask in what ways the science of psychology has influenced industrial thought and practice with reference to these industrial relations.

HOW PSYCHOLOGY HAS INFLUENCED INDUSTRY.

Industrial relations in America have been influenced by psychology in three ways. Industry has responded to psychology as science, as point of view, and as method.

Psychology as Science.

Psychology as a science consists of a systematized body of facts and generalizations about human nature. Foremost among the industrially significant facts of modern psychology are those which reveal the enormous range and variety of differences between people. Scarcely a generation ago American thought and practice was still somewhat under the influence of the political doctrine of equality which had been held most fervently at the time when the nation was born. To be sure, no one had seriously contended that all men are created equal in talent; but scarcely anyone had realized how vast are the differences in native endowment and capacity for achievement until Cattell, Boss, Thorndike and others, exploring the trail originally blazed by Sir Francis Galton, found ways of quantifying and measuring individual differences. They gave graphic and mathematical expression to their measurements.

While studying the wide range of differences which people exhibit in their capacity to discriminate colors, sounds, extent

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of arm movements and other sensory data, they also carried forward investigations in reaction times which showed how greatly people differ in motor capacity. After many of the relatively simple processes had been examined, differences in types of attention were observed. Other investigations were centred on the measurement of differences in ability to localize sounds, to perceive special relations, to remember, to manipulate and construct.

The discovery of the possibility of devising units and scales for use in measuring such differences of ability was an epoch-making invention. Its application was rapidly extended to the measurement of achievement in school work and has had a profound influence on educational practice. Meanwhile procedures were devised - following the pioneer work of Binet and Simon - for measuring the rate and extent of mental development. The concepts of mental age and the intelligence quotient became current. Convenient means for examining large numbers of persons at the same time were perfected; and during the war, data were secured which revealed in spectacular relief the vastness of the spread of human abilities as well as their proneness to cluster about the central tendency of mediocrity.

The differences between individuals not only in abstract intellect but also in social and mechanical abilities were studied. Certain trade tests, for measuring proficiency in different occupations, were standardized. People's interests were made the subject of inquiry, and techniques were developed for quantifying differences in mental attitudes, likes and dislikes, occupational preferences and personal tastes. More recently the ambitious task has been undertaken of measuring the strength of volitional tendencies. Character, as well as intellect and temperament, has come within the range of quantitative measurement; and while the reliability of the methods so far developed for measuring character is so low that few psychologists will venture as yet to draw practical inferences from them, it is nevertheless significant that the idea of mental measurement has now been extended until it comprehends the entire personality.

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Partly as a consequence of these researches, it is recognized, more clearly than formerly, how much individuals differ from each other in originality and initiative, in output of energy, in tact or in social sensitivity, and in self-control, as well as in general intelligence, and in a long array of specific abilities. All these facts, tersely put by Cattell and Thorndike, and emphatically reiterated in public address and in semi-popular writings by Walter Dill Scott, Münsterberg, Goddard, Terman, Hollingworth and many others, have influenced the thinking and practice of industrial leaders.

Many of these industrialists, it may be recalled, were themselves students of elementary or advanced psychology in college when these facts about individual differences were first stressed. Later, in positions of business responsibility, some of them recognized acutely the need of personnel procedures which give due emphasis to these facts of human nature. Functional organization of personnel activities in factory and office, and development of techniques for personnel classification, transfer and promotion, job analysis, employment interviewing, placement, training and follow-up, probably proceeded somewhat more rapidly because of what psychology had done to make more evident the nature and extent of individual differences.

Of practical moment also have been the findings of psychology regarding the relationship between various abilities. For instance, the law of compensation has been found inapplicable. Common belief had held that the person who is greatly superior to his fellows in some regards is probably inferior to them in others - that if he is very talented in mathematics, for example, he is probably something of a dullard in athletics or in art. The facts have been found to be quite the opposite. Persons who are found to be highly superior in one ability are more often than not above the average in any other desirable trait. In other words the correlation between favorable traits is quite generally positive. At the same time, the correlation is in most instances low. Psychologists have often been surprised to find how slight is the association between abilities apparently very similar. If as Spearman and others

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contend, there are certain **general factors** characteristic of a person's make-up - call them intelligence, energy, perseverance or what you will - it is certain that there are also a great number of quite specific abilities, very largely independent of one another.

These findings have lent emphasis to the need for the employment interviewer to be very cautious in inferring future accomplishments from fragmentary data, whether these data are in the form of impressions gained in conversation, mental test performance, school record, or reports from former employers. He needs all the information he can get. He especially needs to find out which items are really significant, under the conditions of work which prevail in his own plant and in the local labor market.

Another inference from these facts regarding the specificity of abilities has to do with the nature of industrial training. There is sound warrant for the tendency toward better training on the job rather than toward more formal training of a general sort.

To precisely what extent industrial practice in the United States has been modified by the body of psychological knowledge regarding individual differences and the correlation of abilities, who shall say? It is obvious that the tendencies of the past twenty years in employment, training, supervision, transfer and other personnel functions have been in the direction of greater recognition of and provision for wide differences in endowment. Public school practice has also been modified in many ways which have made it possible for multitudes of young people more easily to effect a satisfactory adjustment with the working world. Such changes might conceivably have taken place, even though psychologists had not been measuring, analyzing and comparing so many aspects of so many people. It seems reasonable however to suppose that the findings of these kinds of psychological research have directly as well as indirectly had a real influence in industry.

Much the same might be said regarding the generalizations from research in educational psychology. One outstanding

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characteristic of man is his educability, and psychologists have steadily been prying deeper and deeper into the laws of learning. The principles governing the formation of habits, the acquisition of skills, the mastery of technical knowledge, the elimination of gross defects of personality, the development of social effectiveness, the modification of likes and dislikes, the inculcation of ideals and attitudes - all these are applicable in offices, stores and factories as well as in school or college. Some of the best data regarding effects of practice and of fatigue on the work-curve have come from experiments in psychological laboratories.

The doctrines of interest, and of attention and distraction, have had their application where safety devices were to be invented and installed; where jobs were to be classified according to their psychological requirements; where workers and students were to be advised with reference to their future vocational plans. The psychological theories most prevalent a dozen years ago regarding instincts and the fundamental drives which motivate human conduct, have influenced the thinking of industrial leaders regarding financial and non-financial incentives, group spirit the damage done by fear, and the value of insuring to manager and worker alike his sense of self-respect and his belief in the worth-whileness of his labor. Men like Robert Valentine, Carleton Parker, Ordway Tead, Z. C. Dickinson, Robert Bruere, H. C. Metcalf and Whiting Williams interpreted these doctrines for economists and engineers, bridging the gulf that too often divides the psychologist from the industrialist.

Perhaps enough has been said to illustrate the way in which the subject matter of psychology has tended to affect industrial practice. A single case, more concrete than those already mentioned, will serve as a sample of repeated instances in which the discoveries of the psychological laboratory have found useful application.

For many years Professor C. E. Ferree in the psychological laboratory of Bryn Mawr College has concentrated his research on problems of the efficiency of the eye under varying conditions of illumination. He developed new apparatus and more

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precise procedures for measuring the fatigue of vision. Using these methods he worked out the principles which must apply to all determinations of the relative effectiveness of different intensities and distributions of light. He compared the merit of direct, indirect and semi-indirect systems. When his conclusions were first announced they ran counter to the tenets currently held by engineers; but today they are commonplaces of illuminating* engineering practice. Thousands of factory employes, now doing their work under more favorable conditions of illumination, will never know that they have in part to thank a research psychologist for their relief from the annoyances of unnecessary glare, distraction and eye-strain.

Psychology as point of view.

Less tangible than the effects of these concrete products of psychological research, but none the less real, has been the influence on American industry of what may be called the psychological point of view. In essence this point of view consists in a more than ordinarily tenacious belief that human experience is understandable, that human behavior is not a spiritual mystery but a natural phenomenon like other phenomena of the organic world. Such a belief leads to the persistent attempt to understand one's fellows, to appreciate their motives and ambitions, to comprehend their shortcomings and their possibilities. It makes one impatient of superficial explanations of unsatisfactory employee behavior as due to "carelessness" or "laziness" or "pure cussedness". One asks, "Why was this motorman careless?" and proceeds to get the facts about his previous training on the job, his treatment by supervisors, his length and distribution of working hours, his health, his eyesight, his scope of attention, his worries and tendencies to reverie. Then such a vague blanket trait-term as "carelessness" drops out of one's vocabulary. Moreover, the psychological point of view prevents an executive from letting his personal feelings warp his judgment. It helps him to be at once more objective and more intelligently aware of other points of view than his own.

The psychological point of view is that of the scientist trained

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to focus the searchlight of inquiry on every puzzling problem of human adjustment. It is identical with the point of view of scientific management in so far as scientific management concerns itself with the human problem of industry. If there has been any vital difference in point of view between industrial psychologists and management engineers, it is with reference to their primary purpose. The industrial psychologist has wanted first of all to help the worker, in simplifying his methods of work, bettering the conditions under which his work is done, improving his training, and developing personnel techniques which will facilitate his adjustment to the occupation in which he will find the most satisfaction. Incidentally the psychologist may believe that these services will perhaps benefit the industry, the management and the social order also. The engineer has similar objectives but is ordinarily thought of as placing as his first concern the economic stability, prosperity and usefulness of the enterprise. The personal satisfactions accruing to competent, well paid, well trained employees are his secondary objectives.

While this contrast of point of view of psychologist and management engineer may have some historical warrant, particularly in England, it cannot be said to hold universally in America. The writer knows personally Taylorites who seem to him to place considerations of human betterment first, and to regard the industry which they plan for or manage merely as a means to the self-realization of the workers and supervisors who constitute its personnel. He also confesses an acquaintance with psychologists as well as engineers both in America and in Europe who have shown themselves willing to place their talents at the disposal of employers with a single eye to profits.

This difference in attitude and primary interest is not inherent in the science; it is a personal matter. It may depend on temperament, or on the social philosophy one holds.

The question of priority of objective might be a matter of more grave concern at this point, if it were not that the far-sighted investigator - be he psychologist or management engineer - sees clearly that he must travel much the same road

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in either event. After all, there is a considerable identity of interest of employees, managers, owners and public. An industrial psychologist in a chocolate factory recently stated his objective as follows: "The purpose of the psychologist is, to see that the workers leave the plant at night neither fatigued, nor irritated, nor nervous." He showed not a trace of interest in increasing the owners' profits. But when I asked the president of the corporation why he had his psychologist in his factory, the prompt and decisive answer was, "I find it pays".

Psychology in America has contributed to the point of view that it pays in the long run to attempt to understand the deep-lying motives and ambitions of people, and to work with the current of human nature rather than counter to it. It has made the point of view explicit in its application to problems of vocational adjustment, including placement and training, in conformity with the individual's proclivities and talents. In other directions, also, the psychological point of view is coming to be more frequently taken, with promise of leading to better mutual understanding and more cooperative relations throughout industry.

Wholesome as such a point of view may be in approaching questions of human relations in industry, it will not carry the manager far toward practical solutions of his difficulties unless he has at hand the necessary appropriate techniques for problem solving. This brings us to the third way in which psychology has influenced American industry; through its method.

Psychology as method.

The main methods of psychological research are two: experiment and statistics.

The task of any natural science may be stated in most general terms to be the determination of the relationship between variables. The variables with which psychology deals include the environmental forces and conditions which influence behavior, as well as the innate capacities, habits and attitudes of individuals in interaction with the world in which they work and live.

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It is sometimes said that the biological sciences, of which psychology is one, differ radically from the physical sciences in that the variables with which they have to deal are more numerous, complex, and difficult to control. Wherever all the variables, or all but one, can be controlled, the ideal method is that of experiment. Here the ingenious investigator can test his hypothesis by setting up a crucial situation and making observations or measurements which are decisive as to the manner in which the independent and the dependent variables are related. If, however, there are independent and uncontrollable variables which make impossible the resort to experiment, the scientist has recourse to the method of statistics. This is a method which, thanks to Pearson, Spearman, Thorndike, Kelley, Thurstone and others, has been developed extensively in its application to psychological data. It has proved to be an invaluable complement to the methods of the experimental laboratory.

The refinements of statistical procedure evolved in connection with psychological research have been slowly finding their way into industrial personnel studies. If, before the war, one talked to American business men about correlations, scatter-diagrams, regression lines, central tendencies, standard deviations, or measures of reliability and validity, they listened with amused tolerance, if at all. Today these concepts are fairly well recognized as a necessary part of the mental furniture of anyone who undertakes to deal precisely with the data of human behavior. They have found their place in the thinking and writing of many who are undertaking to understand the more fundamental aspects of human relations in industry.

The method of the controlled experiment on the other hand, although simpler to understand and often more decisive in its findings, has unfortunately not been as generally adopted by industry. To be sure, there have been innumerable so-called experiments tried, in industrial relations. But most of these have not been carried out according to the canons of science. A manager has decided, for example, to try the experiment of changing his method of remuneration. In place of an hourly

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wage he has introduced a straight piece-rate; or instead of piece-rate he has tried one of the currently popular task-and-bonus systems. But in most instances he has introduced at the same time several other variables. He has changed foremen, or improved the routing of materials, or insisted on a more thorough coaching and follow-up of new employees, or installed a better ventilating system. So when, after several months, his accounting department reports a decided lowering of unit labor costs, it is still a matter of opinion whether these economies are to be credited to the new method of payment by results. Industrial management cannot hope to reap the full benefits of the scientific method as applied to the study of the human problems of the factory, until it is ready to make a larger number of genuinely scientific experiments.

Psychology has demonstrated the usefulness of the methods of experiment and of statistics in solving some of the complicated problems of human relations. It has developed refinements of technique which are readily carried over into industrial research. Responsibility rests with the individual investigator, however, to furnish the penetrating insight and the ingenuity which alone can formulate brilliant and industrially significant hypotheses for scientific study.

Psychological techniques have sometimes been borrowed by industrial engineers, as in the case of recent fatigue studies, - earlier investigations having failed because the effects of suggestion were not controlled. In other instances, the psychologist has been borrowed as well as the technique, as when Thorndike helped carry out the research of the New York State Ventilation Commission, which established the primary importance of air movement. The Society for the Promotion of Engineering Education has repeatedly called into its councils such psychologists as Seashore and Thurstone. And so the general methods and specific techniques of psychology, - as well as its point of view and its subject-matter, - are gradually being appropriated by industrial engineering.

AGENCIES FOR FURTHERING INDUSTRIAL PSYCHOLOGY.

A sketch of the influence of psychology on fundamental relations

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and conditions in American industry would not be complete without mention of certain agencies which have been carrying forward psychological research and slowly spreading throughout the texture of business and industry some familiarity with psychological content, method and point of view.

Chief among the agencies which have been furthering psychological developments are the universities. Every university has its psychological laboratory for research. It also offers courses of instruction which are taken by great numbers of students. While many of these courses are general in nature, some of them treat specifically the psychological problems of business, such as advertising and selling, and also touch upon applications of psychology to vocational selection, learning, fatigue, incentives, group relations in industry and other problems of management and of individual adjustment. These courses of instruction in applied psychology are for the most part designed to be rather elementary, and broad in scope rather than intensive. During the past twenty years they have served to introduce many thousands of young people to the basic principles of industrial psychology as first outlined by Münsterberg and as formulated from time to time in the books of Scott, Hollingworth, Poffenberger, Swift and others. Such books have had some circulation among mature business men as well as students. Unfortunately the readers have often, especially since the war, been so intrigued by the chapters dealing with mental tests and other devices for the measurement of individual differences that they have overlooked the relatively more fundamental psychological considerations which alone can give to mental test procedures their true significance.

In a few universities there exist also centers for advanced training and research in industrial and commercial psychology. Among the foremost at the present time are the University of Michigan in Ann Arbor, the University of Pennsylvania in Philadelphia, Columbia University in New York, and the University of Chicago, Stanford University in California, Northwestern University in Evanston-Chicago, the University of Pittsburgh, the University of Minnesota in Minneapolis, the Univer-

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sity of Iowa in Iowa City, the University of Ohio in Columbus, and some of the other state universities are hospitable to such research. Promising developments are now taking place in the Harvard Graduate School of Business in Boston, and in Yale University in New Haven. Curiously the emphasis in nearly all these centers has been on the psychological problems of commerce rather than of industry. Curiously, too, the great engineering schools or institutes of technology have completely neglected psychological research. The outstanding exception to this sweeping generalization is the Carnegie Institute of Technology in Pittsburgh, where the writer established in 1915 the first Division of Applied Psychology in any American institution, and later, the first Bureau of Personnel Research, and where, for eight years, a notable group of psychologists were engaged in research on problems of importance to cooperating industries and business concerns.¹ Kenagy and Yoakum's book on "Selection and Training of Salesmen", Strong and Uhrbrock's "Job Analysis and the Curriculum with Special Reference to the Printing Industry", and Craig and Charters' "Personal Leadership in Industry" record some of the more enduring products of these studies. One outgrowth of this movement at Carnegie Institute of Technology was the establishment in 1917 of the Research Bureau for Retail Training. This Bureau, now permanently endowed and affiliated with the University of Pittsburgh, has recently published a summary volume covering ten years of continuous psychological, economic and educational research. The influence of its work on personal practice in department stores has not been limited to the local constituency but has been felt throughout the nation. That competing firms have cooperated in the support of such investigations, is significant. That the findings have in large part been passed on to other firms for the benefit of all and for the public good, is evidence of broad-mindedness. It well illustrates the growing conviction in American business and

¹ An historical account of this development was published in the *Scientific Monthly*, February, 1923, pp. 142-159. A bibliography of publications of the Division of Applied Psychology up to that time contained 63 titles.

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industry, that the ancient practice of maintaining trade secrets wherever possible is sometimes an unprofitable if not a ludicrous form of selfishness.

Such limited psychological research as has been carried forward by individual corporations has likewise for the most part been open to the inspection of any visiting scientist or personnel manager. A few street railway and taxicab companies with laboratories of their own for investigating individual susceptibility to accidents and related psychological problems of transportation, have not hesitated to exchange methods, data and results. Among such firms as the Eastman Kodak Company, the Western Electric Company, the General Electric Company and the American Telephone and Telegraph Company, to mention a few examples from other types of industry, there has been free exchange of specifications for psychological laboratory equipment and of other technical information.

Several of these companies contribute to the support of the Personnel Research Federation which maintains a clearing-house for the exchange of research information, as well as a staff for consulting work and for carrying forward specific studies. Among its current investigations is one on the effects on accident reduction of individual attention to workers who are found to have a susceptibility to accidents. Another investigation, designed in the end to facilitate the flow of correct information from workers to management, consists of a study of the technique of the personal interview. In this task of jointly furthering the scientific approach to the human problems of industry, a number of government agencies, university departments and independent research organizations likewise cooperate. The Engineering Foundation, the National Research Council and the American Federation of Labor initiated this cooperative movement which signaled a definite recognition of the need for coordination of research plans and extensive stimulation of sound research developments in industrial psychology and related aspects of personnel science. The Personnel Journal, now entering upon its seventh volume, furnishes the record of accomplishment to date.

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The establishment of the Personnel Research Federation followed upon the research developments at Carnegie Institute of Technology already mentioned, and other undertakings which had received an impetus from the wide-spread interest in applied psychology awakened by the military accomplishments of psychologists and personnel managers during the war. The Scott Company, for example, with Walter Dill Scott as its guiding spirit, for four years operated as a firm of personnel consultants to large business concerns, and made familiar to American industry a number of psychological concepts, principles and techniques recorded in the volume, "Personnel Management", by Scott and Clothier (1923). The immediate stimulus toward the establishment of the Personnel Research Federation, however, came from two sources. One was a series of significant investigations as to the value of the psychiatric approach to industrial problems, made by the late E. E. Southard, M.D., at the request of the Engineering Foundation. The other was a recognition by the National Research Council, of which James R. Angell was then the head, and of its Division of Anthropology and Psychology, of which the writer was Chairman, that the problems of industrial psychology were of increasing importance and that there was some danger of duplication of research effort unless there existed an agency to facilitate exchange of information, to survey the field as a whole, and to plan constructively in the light of known needs and facilities for research.

The National Research Council, which represents mainly the physical and biological sciences, has continued its efforts to further practical psychology, for example in its applications to problems of highway safety. More recently the Social Science Research Council has come forward, and as one of its activities is helping to plan and to finance selected investigations in industrial psychology. Both of these Councils also offer each year certain fellowships for advanced students of psychology, and a few of these investigators have chosen as their topics for study, problems in industrial psychology and related aspects of personnel science. The Psychological Corporation, founded by J. Mc-

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Keen Cattell in 1921 as a means of making the services of American psychologists conveniently available to industry, has served useful purposes, not least of which has been to inform inquirers as to who and where the real psychologists are, in contradistinction to the dilettantes, charlatans, character analysts and pseudo-scientists who prey upon the public in America as in Europe.

The readiness of business firms to cooperate for the advancement of knowledge in the common interest, may again be exemplified by their support of such national associations as the American Management Association, and the Taylor Society (an international association to promote the science and the art of administration and of management). Both of these organizations have from time to time encouraged discussions of psychological problems and of psychological research before their membership. It is a wholesome sign that the participation of psychologists in the work of these associations has grown somewhat during the past four years.

Papers of industrial significance are occasionally but all too rarely presented before the American Psychological Association. These most often are related to problems of vocational selection and placement, since American psychologists have concerned themselves with determination of interests and abilities by means of various techniques of testing, rating and individual appraisal, more often than with problems of the simplification of work, industrial fatigue, monotony, incentives and similar practical problems of the factory.

One exception to this indictment is Mrs. F. G. Gilbreth who years ago had a clear vision of the problem. She worked jointly with her husband to spread among industrial engineers some understanding of the psychological point of view, especially with reference to fatigue, and to develop ingenious techniques for use in motion study and work analysis. In her private institute she has continued to introduce each year a few engineers to this point of view and to the refinement of these techniques. Another exception is C. S. Yoakum whose contacts with the motor industry and with business concerns have enabled him to formulate specifically problems of personality

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study, work histories, personnel accounting and measurement of the effects of management policies, and whose psychological researches in vocational guidance are basic. Elton Mayo, to mention yet another, has brought the findings of psychopathology and the doctrines of Janet stimulatingly to bear on problems of irritation and irrationality in the factory. A number of younger psychologists are engaged in work which has its industrial bearings, and the temptation is strong to touch upon their individual contributions. Our generalization would, however, apply to the most of them, namely, that they are more often interested in employment psychology than in the psychology of the worker at work.

This paper, already too long, must be brought to a close with a word about industrial psychology in relation to government agencies. It may surprise European readers to learn that the federal government of the United States has never established an agency for research in industrial psychology, such as the Industrial Fatigue Research Board of Great Britain. Some admirable research has, to be sure, been done by the Bureau of Mines in cooperation with the Public Health Service. The Department of Labor and the Federal Board for Vocational Education have published many studies on topics related to industrial psychology. But the research work, at least so far as the writer is aware, has been done for the most part by economists, educators, physicians or engineers, rather than by investigators whose training has been primarily in psychology. Only one agency of the National government has on its staff a well-known psychologist: L. J. O'Rourke, of the U. S. Civil Service Commission. In a strategic position, he is changing for the better the character of the postal service and other government offices, by judiciously applying the techniques of psychological science to the procedures used in selecting and placing government employees. A few municipal and state governments are similarly benefiting by psychological research, and this movement is being fostered by the Bureau of Public Personnel Administration.

And so, in conclusion, it is admitted once more that psychology

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is influencing industrial relations and conditions in the United States most directly through its contributions to vocational selection and the understanding of individual differences. Within other equally important areas of inquiry, the influences of psychological content, methods and point of view have been more indirect, and probably less potent than they will be after labor and management come to a clearer realization of the essentially psychological nature of many of their difficulties, and after more psychologists, in turn, have had the opportunity to come to grips with these difficulties, not as they are defined in books, but as they crop up in the daily relationships of factory operation.¹

¹ Typical of influential books written by economists in order to make fruitful for industry the doctrines of psychology, may be mentioned Carleton Parker's "The Casual Laborer", Veblen's "Instinct of Workmanship", Tead's "Instincts in Industry", Z. C. Dickinson's "Economic Motives", and Whiting Williams' "Mainsprings of Men".

Full of practical suggestions for self training and development of supervisors and young executives is Craig and Charters' "Personal Leadership in Industry". C. R. Allen's "The Instructor, the Man and the Job" is at once psychologically sound and immediately useful.

In employment psychology we have had the books of Link, Chapman, Kingsbury and Kornhauser, Laird, Snow, Griffiths, Kitson, Bingham and Freyd, and Burt.

Of general interest are Overstreet's "Influencing Human Behavior", Helen Marot's "Creative Impulse in Industry", Mary Follett's "Creative Experience", and John Dewey's "Human Nature and Conduct".

The two most substantial manuals on personnel principles and procedures are Tead and Metcalf's "Personnel Administration", and Scott and Clothier's "Personnel Management". The latter emphasizes psychological considerations. Among volumes of narrower scope but more intensive treatment, "The Selection and Training of Salesmen", by Kenagy and Yoakum is outstanding, because it embodies the findings of years of research and experiment in its field.

Three periodicals should be mentioned: The oldest of these, "The Journal of Applied Psychology", publishes technical contributions by psychologists not only to business and industry, but also to law, medicine and other fields. "The Personnel Journal", also technical, is, on the other hand, narrower in scope and confines itself to the subject-matter of its title, with emphasis upon educational and vocational adjustment, but on the other hand is more inclusive, approaching the personnel problem from the economic as well as the psychological angle. "Industrial Psychology" is edited for the business executive, and interprets for him the pertinent findings of psychological research and discussion.

EDUCATION AND INDUSTRY

BY C. R. MANN, PH. D.,

American Council on Education

In the U. S. A., education is now regarded as a process that continues throughout life. The purpose of schooling is to give the young: tools and attitudes of social living; opportunity for self-expression and growth through useful work; habits of self-education. Since work occupies about two-thirds of a normal life, business, industry and the professions are recognizing that they are educational institutions and that their greatest success depends on how far the daily work is educative to the worker. The world's work is being analyzed to discover what are the tools and attitudes of social living so that schools may impart them effectively. Many experiments with objective tests and other methods of appraising personality are being made to find practical means of guiding each to the work he can do best. Success in Democracy is measured by growth of people.

Education in the United States has made remarkable progress in the last ten years. Attendance at secondary schools and colleges has more than doubled. In most municipal budgets school costs constitute the largest single item, amounting generally to 40 per cent and in cases to 50 per cent of the whole. Total expenditures for public education are now more than two billion dollars per year, equalling the Federal expenditures for war debts and pensions. In many localities public school buildings are among the most attractive features of city architecture.

These facts merely indicate the material growth of facilities for public education. The really significant progress lies within. For from the beginning American public schools have had equality of opportunity as their ultimate aim. During the 19th century, this was interpreted to mean the same opportunity for everyone. In accordance with this idea, the common school curriculum was fairly rigid, leading to college and a life of scholarship. Keep the road open for everyone from kindergarten to university was the accepted aim. Children who did not conform were "retarded" and considered "subnormal". The public accepted this judgment as a matter of course. They acquiesced in the conclusion that if Johnny did not make good in school, there must be something the matter with Johnny.

At present equal opportunity no longer means the same opportunity for all. Rather, it means for each opportunity to do

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the thing he can do best. Therefore a new public demand has arisen, based on deep-seated convictions that every child can do something well, and that it is the duty of the school to help each child both to discover what that something is and to find appropriate opportunity to do that something well. The public is now forcing the school to find out what Johnny can do best and to lead him to it.

To meet this new public demand, the schools are experimenting everywhere. Many of the larger systems now have research departments. During the past five years three hundred public schools have been cooperating with the Department of Superintendence of the National Education Association in intensive experimentation directed toward reorganization of curricula and methods. Thousands of teachers are experimenting with general intelligence tests, with aptitude tests, with new type examinations, with achievement tests, and with other forms of detecting specific trends and abilities and of measuring individual achievement in particular types of work. The world's work is being analyzed from many angles to discover what different types of activity are needed and what the special personal qualifications required for each are. The whole educational profession is busily engaged in trying to find practical methods for appraising individual capacity and opening opportunities for its fullest realization.

This is not the time or the place to discuss this great educational movement in detail. Here interest focuses on its bearing on human relations in industry. That its bearing is intimate is evident at once from the fact that industry is vitally interested in fitting men to jobs. Business and industrial managers everywhere know the difficulty of finding the right man for the place. They understand fully the importance for industrial production of so organizing that every man, as far as practicable, works at the particular thing he can do best. Industry is establishing personnel departments which are endeavoring to develop practical methods of solving this fundamental human problem. Therefore the new conception of equality of opportunity as opportunity to do the thing each can do best, which has now taken possession of the schools, has opened a

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new possibility for cooperation between industry and education. Both now see that their basic aims are in reality identical. They are ready to join in a united attack on this great common problem of discovering human talent and releasing it in constructive work.

In the past, efforts at cooperation between education and industry have usually resulted in business men telling school men how to run the schools, and school men telling business men how to operate business. With the new orientation, a new plan of cooperation has developed. It is now recognized that the great service which business and professional men can render the schools is to keep school men accurately and fully informed concerning how business is actually conducted and what its guiding principles are. School men do not now have this information. Until they know definitely what types of opportunity actually exist in life, they are handicapped in their efforts to guide young people to the opportunities they seek.

On the other hand, business and professional men are so absorbed in other work that they do not clearly visualize what types of human ability may be available and how these are best appraised and released in constructive work. It is the chief business of educators to do this, and they should keep the business and professional world informed concerning their findings. Coöperation of this type, in which each supplies the information which he knows best and each receives the information which he himself cannot gather at first hand, leaving both free to utilize the information received from the other in a manner that best benefits both, gives a sound basis of fact on which to build toward practical and worthwhile results. The Chamber of Commerce of the U. S. is stimulating this type of cooperative experiment in several large cities.

If this mutual exchange of information is to be effective, the facts exchanged must be so stated as to be comprehensible to both cooperating groups. Descriptions of the world's work prepared by industry may be so unintelligible to school men as to give them no real help. Similarly, estimates of personal qualifications of young people made by school men may be

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unintelligible to business and professional men. The project does not become practical until patterns or forms of statement have been evolved which are intelligible to both and comparable with one another. Such patterns are the tools and measuring instruments which enable all concerned to work intelligently toward mutually helpful solutions and better human relations everywhere.

Considerable progress has already been made in developing such tools and instruments of measurement. A pattern form of job specification has been evolved by cooperation between the American Council on Education and several industrial firms. This enables industry to describe its work in a manner that is beneficial to it and that yet conveys to school men the kind of information they need. Some 3,000 job specifications written in this form by eighteen different firms are being analyzed for curriculum content. Similarly, personal record cards and rating scales are being developed by cooperation between schools and industries under supervision of the American Council on Education in such manner as to make the appraisals of human qualifications by school men intelligible to men of affairs. Similarly, the Personnel Research Federation is evolving pattern procedures for personal interviews. It is proving a difficult problem to determine what actions are sufficiently symptomatic of personal bent to warrant recording them. It is equally difficult to determine what kinds of ratings by school men have significance in industry. Nevertheless, in all of these directions progress is being made, and with that progress comes improved adjustment of the individual to his work.

The new conception of the aim of American education and the new type of cooperation with the world's work are producing a new orientation of schools toward their task. When schools merely tried to give the same educational opportunity to everyone, their task was finished when they had given everyone as great control as was possible over the instruments of economic and social life. Education ended when the child left school. After that he went to work.

But when the ultimate aim is to liberate, discipline and guide

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constructive energy into useful channels, education continues throughout life. Therefore, the school's duty is only half done when it merely equips young people with tools that enable them to get along in life. It must in addition develop habits and attitudes of self-education and an ambition for self-development which will keep every man and woman growing through self-education for the rest of their lives. The realization of this larger purpose requires far-reaching changes in present school practice. The American school system is at present definitely striving to discover what changes are needed and what new methods lead effectively to better achievement of this, its new aim. The recent organization of the Adult Education Association and the study by the Alumni Council of how universities may help alumni continue growing, point in the same direction.

This movement for closer cooperation between schooling and work does not try to make scholars of all men. Yet it gives those who have scholarly genius better opportunities to achieve high scholarship. It does not kill culture, but secures truer culture by crowding into every kind of work all the excellence it will bear. It dignifies both labor and learning. It does not commercialize education nor create class distinctions. It disciplines men through struggle with difficulties inherent in the tasks they determine to achieve.

This new public attitude toward education in the United States is having a no less fundamental effect upon industry and the professions. In proportion as the schools graduate young people who are eager to continue growing and set in habits of self-education, opportunities for growth and self-education must be found in the world's work. The public demands that industry and the professions supply the needed opportunities. This is not a matter of charity for industry, for herein lies the greatest chance for further industrial progress. Research in natural science and scientific management of production have made possible the present high wages and low costs. The reservoir of human energy that is not yet released in productive effort because of mal-adjustment of workers to their work is now the greatest latent source of further advance, not only

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in industrial achievement but also in human happiness. The habit of fitting men to jobs is becoming a habit of fitting jobs to men.

The most significant fact in American industrial and professional life at present is this steady transformation of industry and the professions into educational institutions. The American people seem to realize that their greatest material success depends upon the degree to which each worker finds the right opportunity for self-education on the job. Growing men and women are happy and productive workers. They grow when each does the thing he can do best, for that is the thing he loves to do. This idea is now working in a number of industrial organizations. When wisely worked, turnover decreases and production increases.

This conception of the common problem of industry and education is peculiar to the United States. A century and a half ago our forefathers established a political system intended to maintain political conditions under which men could achieve liberty through self-government. It has taken 150 years for the American people to develop the conception of an educational and industrial system that is consistent with these ideals of government. The new conscious attitude of the people toward schools and workshops is forcing gradual development of ever expanding opportunities for that self-education which fosters continuing growth. Thus finally may we justify our national existence, since the success of a democracy is not measured by the efficiency of its administration, but by the growth of its people.

PERSONNEL ADMINISTRATION

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Beside the trend toward decentralized responsibility in personnel administration, several tendencies are apparent in selection, training, labor supply, research, the make-up of personnel departments, wages and salaries, profit-sharing, compensation of executives, hours of work, vacations for manual workers, pensions, stock purchase and savings plans, insurance and benefit plans, vocational adjustment, health and sanitation, safety, service to employees and joint relationships between employers and workers.

A growing interest in personnel administration includes a consideration of sales and office personnel problems, inasmuch as new forms of competition have necessitated cost reduction. Factory executives who have long been cutting costs are now urging that similar economies be devised by the marketing and office departments. Attention is now being concentrated on those personnel activities which make for sound business, increased earnings for workers as well as profits to the company, increased purchasing power for the community and consequent business prosperity.

There are so many different industrial sections of the United States of America, each of them influenced more or less by the dominance of different types of industry and affected by different stages of industrial development, that any attempt dogmatically to indicate the personnel trends in America is likely to be subject to so many lines of dispute as to make the effort almost reckless.

This paper will, therefore, attempt simply to survey the most outstanding new developments and to indicate trends which are likely to become most marked in the next few years.

ORGANIZATION FOR PERSONNEL ADMINISTRATION.

The time was when personnel work was largely regarded as the job of the personnel man and there were many persons who argued that the personnel department should have entire control of personnel administration. This was true particularly of the period from approximately 1914 to 1920 when personnel administration was being rapidly developed and when personnel men were struggling for a degree of recognition, influence and even authority which previously they had not had. The natural result was that with notable exceptions there was an over-emphasis of the authority of the personnel man and an under-emphasis of the personnel functions of the line or-

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ganization from foreman to president. This resulted in many conflicts of jurisdiction and authority which were very disturbing to the effective working out of a personnel program.

Since the great depression in 1920 and 1921, including among many other things some deflation of the personnel movement, a rather different point of view has grown up.

In the first place, it has become a generally accepted principle that personnel administration is a function of every person who supervises others in the organization. One hears speakers and finds writers discussing the qualities of foremen in terms of whether or not the foreman is a good personnel man and there are even references to presidents and general managers as good personnel men. There are not a few presidents of companies who openly make the statement that they are the chief personnel directors of their companies.

As a result, personnel men, instead of claiming that they have absolute power in selection, placement and dismissal of workers regardless of any preference or conviction on the part of the foreman, are now claiming that it is the function of the personnel department to facilitate the work of the supervisor in dealing with the personnel problems involved in management. "Facilitation", the admirably expressive term used by Mr. Oliver Sheldon in his excellent book on "The Philosophy of Management", is a term which is beginning to make its influence felt in the United States and a term which gradually is being used more and more generally. The personnel department is thus being recognized as a facilitating department, its functions being to assist the organization in the preparation and execution of personnel policy through research, advice and cooperation.

FOR SELECTION.

An employment manager, for instance, does the initial job of weeding out the applicants for employment, selecting those who would have a fair chance of fitting well into the organization and referring them to the supervisor who is in need of additional help. In making this selection, the employment man-

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ager, of course, weeds out persons whom the supervisor might be disposed to employ, but who would not fit well into the organization. It is still true and probably will continue to be true in the majority of companies that no supervisor will be permitted to employ men who have not had the approval of the employment department. But the power of employment managers to prevent a foreman from dismissing an employee from his department has practically disappeared. Every foreman has, or should have, the power to dismiss from his department, referring the employee to the employment department either for a final separation from the company or for transfer to some other department. On the other hand, most personnel departments have the responsibility of transferring men from one department to another within the company even against the wishes of department heads who may wish to keep men in their respective departments. Of course, in common practice, department heads have been shown the value of cooperation in this matter and transfers are made without friction.

In the light of this newer point of view responsibility for results is clearly indicated and there is no confusion as to authority in regard to the administration of any department of a company. In cases where supervisors have unusual turnover or seem unwilling to cooperate with the employment department, either by releasing men for transfer or by accepting a reasonable proportion of men selected by the employment department for employment, the solution of such difficulties lies in the possibility of the employment department recommending to executives, higher up than the offending supervisor, the possibility of the removal of the foreman or the correction of the abuses for which he has been responsible.

In the development of this principle that personnel administration is an integral part of management, there have been several other evidences of progress. For instance, it is customary for supervisors to participate in the preparation of such documents as a manual of employment procedure or a syllabus of instructional outlines for training of employees. The net result is that the line organization, including the foreman, are much more likely to be cooperative in helping to carry out

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the personnel program when they have had a part in the preparation of the policy and program and the tools which are used in carrying it out.

One very logical corollary of the newer point of view is an effort to train the supervisor in the process of carrying out the company's personnel program. In some companies, this, of course, has been done informally for years and is simply instinctive good management. Indeed, there often is no thought-out philosophy with regard to such interpretation of policy. It just happens because of the good sense or natural inclination of the leaders of the business. But in very large organizations, even though the upper executives have such spirit and vision, it becomes extremely dilute before reaching the lowest ranks of supervisors. Therefore, it is highly desirable that some more or less formal steps should be taken to convey this policy effectively down through the organization.

In the last two or three years a few companies have begun to train the supervisor in carrying out the company's personnel program. Without such steps, the personnel work of a large organization is likely to fall down at its weakest point, and all the energetic, intelligent and well-informed efforts of the director of personnel will scarcely get past first base unless steps are taken to strengthen all the positions on the team by which the personnel program of the company must be carried out.

FOR TRAINING.

This educative point of view finds expression most clearly in a company's program for the training of employees. The training of rank and file employees has been conspicuous in American industry for nearly 30 years. At first the emphasis was primarily on what might be called education as distinguished from training. In a good many cases such an educational movement was initiated by an executive officer of the company who himself had had comparatively few educational advantages and who was inspired to give advantages to his employees which he had not had himself. The motive was essentially philanthropic rather than economic and the driving power was

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emotional rather than intellectual. A contributing factor was the need for training in English and citizenship for the large numbers of non-English speaking immigrant workers. A good deal of the instructional material had little bearing on training for the job and might be regarded as a substitute for the work of the public schools.

During the war and its attendant industrial boom, industry was forced to lay emphasis on training for the immediate job and the consequence was a rapid growth of vestibule schools which provided quick instruction in the elements of performing the job. Consequently, there was a shift from an emphasis on what may be fairly called industrial education to job training.

Meanwhile, industrial training was influenced by different pedagogical ideas. Whereas the earlier instruction offered by companies was conducted by what was called "corporation schools" with formal class rooms, instructors, etc., the newer tendency was for training the worker on actual production under an instructor foreman, and this change in method brought such quick and effective results, that it was a very large factor in making possible the increase in wage levels which took place during the long boom period from 1914 to 1920.

Into American business has come of recent years a group of advanced pedagogical thinkers from the university schools of education. They brought with them the project method of teaching involving what we now commonly call training on the job and the preliminary steps that were taken during the war have, in some quarters, been carried much further to the extent that the supervisor, regarded as the real teacher of the worker, is being trained in the process of teaching so that he may perform his functions better than ever before, better than the training function was performed by corporation schools, and better than it was performed by the foreman or the journeyman before the era of corporation schools began.

One of the largest electric manufacturing companies has practically done away with all formal classroom instruction of employees and is concentrating its efforts on training the foreman to train. A syllabus for supervisors in an electrical

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public utility company consists largely, practically 90 to 95 per cent, of material which deals with teacher training for foremen, the assumption being that in order to make the training program really effective, steps must be taken to make the training of the worker continuous from the time of entering the plant until he leaves it, and on the principle that the best training is that training which is given in connection with actual work under normal circumstances of supervision, incentive and responsibility.

The president of one of our most progressive companies has frankly said that management is in large measure, 80 to 90 per cent, an educational and training job. He illustrates by saying that on one occasion a number of executives of his company analyzed exactly what management is in terms of specific operations, and that after classifying all of the typical operations, nine out of ten of them were listed under education and training.

The reasonable inference from this analysis is that the great proportion of training is the function of the supervisor, and a logical and necessary corollary is that in order to get that training done effectively the supervisor must be taught to train. This naturally raises the question as to what is the function of an educational or training department where one exists. The answer is that it logically comprises four main headings:

To provide that enthusiasm and promotive quality which spreads interest in training throughout the organization and creates desire and willingness on the part of every supervisor to take part in the training process.

To help to prepare the instructional outlines to be used by supervisors in the training of their workers. One says "help" advisedly because it may easily be recognized that when the supervisors themselves have prepared the instructional outlines with the help of an educational department, they are much more likely to take an interest in the training program and to feel a definite responsibility for making it effective.

To prepare, improve, and constantly revise the procedure

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for carrying out the training program, thus facilitating the work of the supervisor.

To take a very active part in training the supervisor to train.

On this point it might be argued that the upper executives ought to have the responsibility of training the supervisor to train, and doubtless as time goes on there will be more of their participation in this step in the training program. There are instances where a general manager has actually taken this position and, having done so, has expected his associates next in line to repeat with those further down in the organization.

LABOR SUPPLY.

When the personnel movement first began in America, chief emphasis was on those problems which have to do largely with the manual working force. This was intensified during the war period by the comparative dearth of labor. There is, of course, no less attention to these problems today than ever before, thanks partly to immigration restriction and the fact that were it not for increased output per man hour due to "labor saving machinery", "labor saving management" and better morale, the United States would be faced with a serious dearth of labor today. The labor supply problem in America is likely to continue to be important. Indeed, there are those who believe that the present situation in which there are comparatively few strikes and a small surplus of labor for employment, may not continue for many years.

During the last three or four years an outstanding amount of improvement has been made in the output per man, through vast installations of effort-saving machinery and introduction of incentives for factory workers and other similar measures, but there is a serious question whether the ratio of increase of output per man hour can be kept up and whether with the growth of American industry and continued immigration restriction, a dearth of labor will not reappear again seriously in the course of the next decade.

RESEARCH.

Reference has been made to the advisory relationship of a

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personnel department to the line organization. It will be recognized, of course, that the effects of sound advice must be based not only on the personality and promotive qualities of the director of personnel activities, but also on scientific research in the field of personnel. Incident to this changing conception by reason of which the personnel job has been squarely placed back on the shoulders of the supervisor, the personnel department has been, to a considerable extent, relieved of what may be called operating personnel responsibilities, and is thus left time for more intensive research on the personnel problems of the company. Consequently, personnel departments are less disturbed by the five to ten minute interruptions and are more able to concentrate on more fundamental investigations of personnel problems. These have taken many directions such as research on hours of work, bonus plans, pensions, profit-sharing systems, group insurance, suggestion systems, employee investments in company securities, savings plans, mutual benefit plans, discovery of methods of labor stabilization, even developing wholly new lines of product to fill out seasonal gaps in employment.

SALES AND OFFICE PERSONNEL PROBLEMS.

All the world knows about post-war competition due in part to excessive plant capacity at the end of the war, but America is becoming familiar with new forms of competition - competition between lines of industry which produce substitute commodities - the radio begins to take the place of the talking machine, cement begins to make inroads in the construction industry, giving brick and steel construction a new line of competition more severe than they ever experienced from within their own industry. New methods of transportation bring territorial sources of supply in competition with each other more severely than ever before.

The result has been a severe pressure on the manufacturing end of business to reduce costs to an extent that the factory executive has begun to protest and to urge that the same economies and the same reduction of unit costs shall be made

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effective in the marketing end of the business and in office administration.

As a consequence, the interest in personnel, which at one time was largely confined to the manufacturing side of business, is directing itself equally toward the distributing and office ends of business. Office personnel departments and sales personnel departments have been established in many American companies during the last few years. Banks and insurance companies are giving as much attention to office personnel problems as was formerly given to manual workers by manufacturing companies. The careful selection and training of salesmen is as important and popular a subject as the training and selection of labor. This process has really only begun.

ORGANIZATION OF PERSONNEL DEPARTMENTS.

Another result is that it is not infrequent to find that a company may have several personnel departments: for instance, an office manager who is also a manager of the office personnel department; a factory personnel department and also a sales personnel department. In a company having several plants, there are usually managers of personnel departments at each of the factories, with a central personnel department which has no authority over the personnel men in the various factories or other units, but which cooperates by providing information and by advising the personnel men in the units and also by advising the major executives of those units. There are even instances of marketing organizations which have managers of personnel departments in branch offices.

Some years ago it was not unusual for companies to have several personnel men; for instance, a employment manager, a manager of the educational department, a secretary of the pension committee, a secretary of the mutual benefit association, a safety engineer, etc., etc. In recent years there has been a tendency to coordinate these several activities into one personnel department with a chief in charge with several assistants specializing in the various problems of personnel within the organization. One typical personnel department is headed by a supervisor of industrial relations who has as his associates

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a safety engineer, a manager of employment department for headquarters, a personnel statistician, an educational director, a manager of the company store and a medical director. Most of these have an advisory relation to the executives of branch offices and factories as well as to personnel men in those respective units.

It may be of interest to discuss the position of the personnel man in a company by reference to the titles under which he operates. There are a number of instances of personnel men who are staff vice-presidents of their companies. Employment Manager was a very general title a few years ago, but in many instances it has been superseded by titles involving the word "personnel". For a time, the term Personnel Manager was spreading rapidly, but more recently the use of such titles as Director of Personnel Activities, Supervisor of Industrial Relations, etc., has been increasing. The comparative abandonment of such terms as personnel manager reflects the point of view that the personnel man does not manage or direct the personnel, but rather manages or directs the work of the personnel department. The management of the personnel is in the province of the line supervisor.

There are, of course, a great variety of titles: Manager of Personnel Activities, Service Manager and a great many special titles like Manager of Training Activities, Secretary of the Personnel Committee, etc.

It may be of value to touch on the outstanding evolutions and trends, so far as they may be discovered, with regard to certain special personnel activities. A good deal has already been said regarding the trend in respect to training.

WAGES AND SALARIES.

There has been a very marked tendency toward the growth of extra incentive methods of compensation of employees. There are, of course, a great variety of formulae for setting up a compensation plan, about 25 of them being known by the names of the men who invented them. There are, in addition, a great many others which are adaptations of these.

One of the most significant developments is a comparatively

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rapid growth of group bonus plans for manual workers, the group receiving compensation on the basis of the output of the group. Sometimes these groups consist of men who are doing exactly the same work in which several men have to cooperate. In other cases, the group consists of men who carry an operation through several steps. In some cases the foreman is included in the group, or at least receives extra compensation based on the output of the group.

One of the distinct advantages of the group bonus plan is that it puts a premium on cooperation, encourages workers to insist upon their fellow-workers doing a fair share of work, being on the job promptly each day and in some cases, it encourages the worker to help train his fellow-worker.

Extra incentives through commission plans or bonus plans are becoming very general as a means of compensating salesmen. The tendency is growing.

Until very recently, however, there have been comparatively few instances of compensating office employees on the basis of a measured output. This has been due, in large measure, to the difficulty in measuring the output of various classes of office employees. In the last few years, however, some very substantial work has been done in developing methods of measuring office output, the number of companies which are applying them has rapidly increased and new techniques have been evolved for measuring certain classes of office work which previously were never measured.

This development is making it possible to compensate office employees on the basis of output and the next few years will probably see a very substantial growth in this direction.

An intermediate stage in compensation of office workers has been the development of what is usually referred to as job classification and salary standardization in which jobs are rated and classified, and minimum and maximum limits set for classes of jobs.

PROFIT-SHARING.

In general, it may be said that the growth of profit-sharing as applied to rank and file workers has practically stopped in

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America, many plans having been abandoned. The conviction has grown that while profit-sharing may be an excellent arrangement as applied to persons of some responsibility, it has comparatively little effect on the rank and file, and is always in danger of creating an adverse effect when a period of low profits or of no profits arrives.

Incentives which are based on the actual output of the individual and extra compensation paid very shortly after the production period has been completed has, in large measure, taken the place of profit-sharing as applied to rank and file employees.

COMPENSATION OF EXECUTIVES.

In the days when ownership and management were almost identical the compensation of the manager was equivalent to the profits of the business, but with the practical divorce of management from ownership which came with large scale industry and the development of the corporation, the first tendency was to put the manager on a salary, his dividends from stocks comprising a comparatively small part of his total income. There were, of course, many private "deals" in which the manager was paid a salary and received as additional compensation either a bonus based on profits for the year or the dividends on stocks which were assigned to him and which, by good management, he might make extremely valuable. These cases applied, however, chiefly to the president or general manager of a company and to some extent to general sales managers on the basis of a bonus, usually on the total volume of sales.

In recent years there has been a distinct tendency toward applying the principle of extra incentive to other executives - factory managers, district sales managers, the foreman and other supervisors and even to staff men, the results of whose efforts it is usually comparatively hard to measure.

Some of these plans take the form of the more or less old-fashioned profit-sharing plan. In general, the tendency, however, has been to base the extra compensation, so far as possible, on a measurement of the results of the efforts of the

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particular individual. The net result of this departure is to reintroduce into large scale business in America some of the elements of incentive which were general when business was small and when the manager was also usually owner and thus had a direct interest in the business.

HOURS OF WORK.

The work time per day and per week has been decreasing in America over a long period of years. The greatest public issue was the steel industry's 12 hour day which, three years ago, became a thing of the past. The elimination of the 12 hour day in the steel industry does not seem to have in any way justified the alarming predictions which some persons were disposed to make. In fact, there were many people in the steel industry who believed that it could have been done long before.

During the last two years the most significant occurrence was the adoption of the five day week by the Ford Motor Company and the growth of a good deal of propaganda in favor of the general spread of the five day week. There has been comparatively little evidence that the movement is spreading widely, but there are those who predict that five or ten years from now, the five day week will be as general then as the five and a half day week is today.

VACATIONS FOR MANUAL WORKERS.

Vacations with pay for executives and offices workers have long been general, only a comparatively small number of companies holding out against vacations with pay for office workers.

Vacations for manual workers are becoming more general. In some quarters the opinion is held that this vacation with pay increases the loyalty and efficiency of the worker and that it pays profits to the company even though it does somewhat upset the production schedule. A great deal depends upon the custom of the industry and the custom of the community.

It may fairly be said that while there is no well thought-out attitude on the practice of vacations with pay and that the

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practice is more or less a matter of expediency, nevertheless, it is probably gradually becoming an unwritten part of the contract of employment.

No American state has made vacations with pay a legal requirement - not even in Canada where this step has been agitated with considerable force by labor organizations.

PENSIONS.

Pensions have been rapidly creeping into the industrial fabric of America, at first slyly in the form of informal pension plans which were more in the nature of special treatment of individual cases and later more openly through the adoption of formal pension plans. The topic is subject to a great deal of dispute and some companies which established pension plans some years ago on a rather liberal basis are beginning to find that the accumulating pension cost is much higher than they had contemplated. One tendency, partly in order to keep down the pension cost of companies, is an inclination to put pension plans on a contributory rather than the non-contributory basis on which most of the earlier pension plans were based.

STOCK PURCHASE AND SAVINGS PLANS.

A good many companies have provided for the purchase of the securities of the company by the employees. At first such plans were established largely in the expectation that they would affect the loyalty of the employees to the company and the efficiency of their work by giving the employee an interest in the company. Some of these plans were very generous, the company in many cases making a partial contribution.

More recently, the emphasis has been placed on the thrift and savings aspect of the purchase of company securities by the employees and the contemporary stock purchase plans have therefore taken on a somewhat more conservative aspect.

One large company has established what is practically an investment trust, an affiliated securities corporation, the shares of which employees buy. The securities corporation in turn purchases a variety of securities, including the bonds, preferred and common stocks of the manufacturing company, as well as the securities of other companies.

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INSURANCE AND BENEFIT PLANS

Group life insurance has been one of the substantial developments of the last ten years. Altogether there is approximately six and one-half billion dollars of group life insurance in effect at the beginning of 1928.

At first, a large proportion of group life insurance plans were non-contributory, that is, the company paid the whole cost, but more recently there is a very strong tendency toward having the employee share in the cost.

Similarly, there has been a great growth of benefit plans, a movement which began earlier than group life insurance. These benefit plans provide a scale of benefits for certain disabilities including accidents, sickness and death.

In many cases they exist side by side with group life insurance. In other cases they are more or less a substitute for group life insurance.

As in the case of group life insurance, there has been a strong movement toward contribution by the employees as well as a contribution from the company, and also a strong tendency toward administration of the mutual benefit fund by an employees' committee with the advice and cooperation of executives of the company.

VOCATIONAL ADJUSTMENT.

The preparation of job descriptions and job specifications has been much discussed, but until recently, much more discussed than acted upon. Both of these results of job analysis are almost essential for any plan of job classification and salary standardization, both of which have been growing. One distinct tendency in job analysis is the setting up of a statement accentuating the "job difficulties".

The introduction of new employees to their jobs, especially to the foreman and to the fellow-workers and the environment is being performed more effectively than ever before with distinct advantages not only to the company, but also to the employee through increased output and increased earnings during the initial period of employment and reduced turnover among new employees.

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Gradually the idea of transfers and promotions from within the organization is spreading, without, however, taking the form of a rigid rule which prevents the recruiting of necessary specialists from outside of the organization.

The rating of rank and file employees which was prominent a number of years ago has largely been eclipsed by the growing attention to the rating of persons of possible eligibility for promotion to executive positions of greater responsibility.

Promotion out of the company is a policy adopted by a few companies with good effects on the morale of the organization.

HEALTH AND SANITATION.

Promotion of health and sanitation has been probably the least effective of all movements in personnel administration, but this is a subject which is beginning to attract a great deal more attention. The costs to the company and to the employees of ill health, consequent absence from work or inefficiency on the job, are regarded by many as vastly more important than the accident problem to which a great deal of attention has been given.

In nearly all large companies, medical examination prior to employment is the rule, but compulsory periodic medical examination for those already on the payroll has not made rapid progress, though there are those who have this policy and are emphatic in their praise of it, denying that it has been attended by any serious complications or objections on the part of employees.

In most companies, however, emphasis has been placed on health education rather than compulsory examination and the best practice has been to concentrate, not so much on the rank and file employees, as upon the supervisors who in turn carry the message of the health program to the employees. This is another good illustration of the advantages of a decentralized responsibility in personnel administration.

SAFETY.

Because of the spectacular losses resulting from industrial accidents a great deal of effort has been expended on reducing

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the number and seriousness of such accidents. Workmen's compensation legislation has been passed in all but three of the states and safety work is vigorously promoted in many companies both large and small.

Results from this phase of industrial relations work can be isolated more easily than from any other and this very quality of tangibility has undoubtedly had a great deal to do with the interest shown in accident prevention. Certainly the record of accomplishment is so remarkable in companies where sustained and intelligent effort has been made that it should serve to convince any set of officials of its worthwhileness.

Figures issued yearly by one large corporation indicate what can be done. From 1906 to 1926 serious and fatal accidents have decreased 60.22 per cent and from 1912 to 1926 disabling accidents (including all accidents with loss of time greater than the working turn) have been reduced 83.81 per cent. This decrease has been concurrent with a marked expansion in properties and in numbers of employees. The results have been accomplished by careful engineering which has removed physical hazards in the plant or on machines; by keeping complete records of accidents sub-divided by cause which indicate where added precautions are necessary; and by a ceaseless campaign of education. Each is necessary but perhaps the educational campaign has yielded the greatest returns.

About \$20,000,000 has been spent on accident prevention since January 1, 1912. Had accidents continued at the 1906 rate, however, far more would have been paid out under the various state compensation laws to the injured and their families. If, as a large insurance company recently stated, it is true that to every dollar of compensation cost resulting from an accident must be added four dollars to pay for lost time, labor turnover, waste of materials, interference in production and other conditions arising out of the accident, the saving from accident prevention is many times greater.

While for some years safety education was directed largely toward rank and file employees, it has been found by another very large company that still greater improvement can be made by concentrating the safety educational attack on the

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foreman - another illustration of decentralization of personnel activities and of carrying out the personnel program through and by the line organization.

SERVICE TO EMPLOYEES.

In the early stages of the personnel movement in America, a relatively large proportion of attention was devoted to what was called welfare work, comprising such activities as social clubs, recreational activities, camps, athletic activities, employee publications, company stores, sales and discounts for company products, legal aid, housing, restaurants, etc.

Probably as much is done by companies today as formerly along these lines, but this general group of personnel activities is much less conspicuous than formerly because it is being overshadowed by many newer and relatively more important activities.

There has also been a tendency to eliminate certain classes of personnel service and to continue only those which have a direct bearing on the efficiency of the employee, his earning capacity and, by implication, his value to the company.

Other activities which have a much less direct bearing on the company's interest are being turned over more and more to actual administration by the interested employees themselves, and many of these are financed almost entirely by the employees. This gives employees an increased measure of autonomy and a more self-respecting status. This tendency is a good illustration of the trend away from a paternalistic attitude toward employees.

JOINT RELATIONSHIPS.

The term "joint relationships" is used in the United States to designate the dealings between management and employees on matters of mutual interest, particularly as affecting such vital subjects as wages, hours, and working conditions; discipline and grievances; and efficiency and economy of operation. In industries in which employers recognize trade unions, joint relationships usually are handled between the management and the union organizations. Union contracts customarily cover

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wages, hours of work, and general conditions in the shop, and occasionally they include agreements for the mediation or arbitration of disagreements, for unemployment insurance or for other subjects outside the routine of ordinary union negotiations. There has also grown up in some industries a system of union-management cooperation, having for its purpose joint endeavors toward the promotion of operating efficiency, the reduction of costs, and the building up of morale. The union labor movement is treated in another paper in this series.

Perhaps the most impressive development of recent years in connection with joint relationships in American industry is employee representation. Under this classification are included all formal agreements for direct dealing between management and representatives elected by and from the employees in an individual company or plant.

The representation movement as a conspicuous part of industrial management dates from about 1915 and the period of its greatest growth did not begin until after the United States entered the World War. In the period of business depression beginning in 1921, a considerable number of plans were abandoned, but in the last five years representation has shown a steady growth.

Under the typical plan of employee representation the workmen of a single company elect representatives from among their own number, usually by voting districts arranged in such a way that each representative has for his constituents fellow-workers with whose conditions and jobs he is intimately familiar. These employee representatives deal with representatives of the management through joint conferences and joint committees and in other ways. The authority of the shop committees or works councils and the scope of subjects which they are authorized to consider vary in the procedure of different companies. While in a few cases, employees are prohibited from joining unions or from joining a particular union that has been in active opposition to the employing company, it is usual for a representation plan to provide explicitly or tacitly for the undiscriminating employment of union and non-union men.

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In addition to the organized practices in joint relationships that have been discussed, there are many less formal methods of dealing on subjects of mutual interest. In some companies the approach of the employees to the management is limited to line officials, with whom the individual workman is required to take up grievances or suggestions. In others the personnel department functions as the point of contact between management and employees. There are infrequent cases in which employees elect members of company boards of directors.

An important function of any procedure in joint relationships is the exchange of information and opinions between management and work people. Sometimes this is effected through a representation plan or an agreement for union-management cooperation; sometimes through employee's newspapers or other plant publications, and sometimes through more or less formal suggestion systems under which workmen are encouraged to submit to the management their ideas as to improving conditions or methods of operation. Usually these suggestion plans include the payment of awards for valuable ideas that are adopted.

INTEREST IN PERSONNEL ADMINISTRATION GROWING.

In the last few years there have been times when, on the surface, it might seem as though the personnel movement in America had received a set-back. This was due largely to the fact that at various times there seemed to be an unusual number of personnel men who were looking for positions. Actually, many of these had become interested in personnel administration and were anxious to return to the work.

Virtually, there is vastly more interest in personnel administration in America than ever before and that interest is on a sounder basis. For some years it was difficult to get the factory manager or the president or other line official to take an interest in personnel problems, the inclination being to refer all such matters to the personnel man.

With the growing recognition that personnel administration, on a sound basis, has a definite relation to the business success of the organization, much of this has disappeared.

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Furthermore, it is being recognized that sound management has a very definite relation to the interests of the employees and that the introduction of effort-saving machinery and labor-saving management and the development of better morale almost inevitably result in greater output as a result of which the employees receive increased earnings.

An interest in personnel administration has become eminently respectable especially as the subject matter is approached in terms of management. Indeed, it would be practically impossible to keep the subject of personnel out of any meeting of executives discussing almost any management problem, whether it be treasurers or comptrollers at a conference on financial management; factory executives at a conference on production; sales executives at a conference on marketing; office managers discussing office management; or at a round table of the presidents discussing problems of general management.

What appeared to be a period of declining of interest in personnel administration from approximately 1920 to 1924 may now be interpreted as a period of transition following which attention is being concentrated on those personnel activities which make for sound business, increased earnings for employees as well as profits to the company, increased purchasing power for the community and consequent business prosperity.

NEW DEVELOPMENTS IN THE LABOR MOVEMENT

BY FLORENCE C. THORNE,

American Federation of Labor

The American labor movement has distinctive policies and agencies to meet New World conditions. Its outstanding characteristics are its philosophy of voluntarism, emphasis on economic agencies, rejection of the class conflict philosophy, and advocacy of cooperation to promote the interests of all concerned in production. The interest of the American trade union centers on the job itself. It seeks betterment in hours and wages as the medium to other opportunities. American trade unions have declared that increasingly higher standards of life can be maintained only through increasing productivity, and thereby recognize their interest in more efficient production. This brings the union to a concern for work processes.

The American Federation of Labor is emphatically advocating educational methods and research, and is taking the lead through its official journal.

The most significant development of American trade unionism is union-management cooperation. Where collective bargaining has provided fair conditions of work and mutual confidence, it is possible for workers to make a constructive contribution in the work itself. These contributions represent craft or creative interest in the job and are of various forms - such as the engineering production service of the printing pressmen, maintenance of craft membership by the full fashioned hosiery workers, up to provisions for specific organization for union management cooperation developed for railroads.

Standard labor unions in the United States are the only agency that maintains social standards for the workers and serve to unify and stabilize terms of employment throughout the industry to accord with progressively higher standards.

Before considering the new tendencies of American labor, a summary of the distinctive characteristics of the American labor movement is necessary in order to interpret current developments. American trade unions reflect in their policies and methods the outstanding features of community life of which they are part. American civilization developed in a pioneer country. There were rich natural resources in bountiful supply but industrial pathfinders were necessary. The heroes of that age were those with the spirit of adventure necessary to cope with pioneer environment. Distinction is still the reward of those with daring and faith for additional progress and achievement.

Industry in practically every instance has preceded political development in its field and has relied upon individual initiative and voluntary undertakings. As there are wide areas to serve, industries have followed plans commensurate with business possibilities. The relative absence of traditions has brought

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flexibility in thought and procedure. There is a notable willingness to adopt new techniques and meet new opportunities. Our rapid progress has been due to leaders of the pioneer type accustomed to find their own paths and assume responsibilities. The American labor movement developed out of this new world environment has adapted its methods and agencies to meet its specific problems. Though many labor ideals were of old-world origin, they have been adapted to a new world atmosphere and experience.

The American labor movement is now expressed through the American Federation of Labor to which are affiliated the more important national and international labor unions with the exception of the four railroad brotherhoods in the operative service of the railroads and the Amalgamated Clothing Workers Union. Due largely to the fact that its leadership was practically unchanged from 1886 to 1924, the American Federation of Labor has a most distinct personality. With the death of Samuel Gompers in 1924 and the election of William Green to the presidency, there has been no change in the fundamental philosophy of the Federation. Its policies are unchanged, though Mr. Green gives new emphasis and new presentation to constructive functions of the union. While in no way minimizing the necessity for militant defense, he insistently points out that the way to progress for all concerned in industries lies through the conference table to daily co-operation between management and unions in doing the day's work, each group contributing of its work experience and assuming responsibility for its functional contributions. Co-operation of self-dependent groups will, the Federation maintains, give industry the richest contributions of creative thought and work.

The distinctive characteristics of the American labor movement are:

Voluntarism as the basic philosophy.

Primary emphasis on economic agencies and economic objectives.

Rejection of the class conflict theory and acceptance of the

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idea of mutuality - but not identity - of interest of all concerned in production.

American trade unions have made voluntary principles the cornerstone of their philosophy. They believe that relationships between persons should be based upon consent, and that as individuals and groups make progress in experience and understanding, voluntary relationships will be on successively higher planes. Unions believe that the individual worker finds opportunity for personal growth and progress through voluntary association with others in the same craft or occupation. Each work group is regarded as the best judge of its own needs and abilities to contribute to industry, and retains for its own decision changes and adjustments in the terms and conditions under which work is performed. The union, which is the repository of the human and work experience of those who handle the tools and materials of industry, makes an essential contribution to the development of industrial order and procedure.

The American labor movement put first in its program higher wages and shorter hours, believing that these two objectives controlled the opportunity and the means to social, material and spiritual progress. It believes that problems involved in making changes in the terms and conditions of work are best understood by those in the industry, and that therefore economic agencies can most effectively deal with these problems. American labor looks to its unions for special services for workers as a group and to governmental agencies for services which embody social ideals of concern to the nation and to workers as citizens. American workers, feeling that in their civic and social relationships there are no fixed classes, look for progress through the development of democratic ideals and institutions for all society. This fundamental feeling for equality is reflected in the disinclination of unions to seek legislation to decide their problems, in addition to their conviction that economic methods and agencies are more effective in dealing with economic problems because they are a part of the matters they seek to control. The fact that American unions

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have not looked to partisan methods has centered efforts on economic progress, which has been a factor in giving the United States the highest wages of all countries.

The main dependence of American workers is therefore on the initiative of unions and collective bargaining. The unions are the only agency that maintains social standards for the workers and serves to unify and stabilize terms of employment throughout the industry to accord with these progressively higher standards. The standard trade union is the only organization through which workers have as yet made a functional contribution to industry.

In the new world chance is recognized as inseparable from opportunity. American unions prefer the hazards of chance to the securities of more definitely fixed conditions. Reduction of hours of work and higher wages open to workers control of more time and more opportunities for development. The main demand of American labor is for opportunity. This attitude has been fundamental in making collective bargaining as the basic machinery for putting the union program into effect. As various unions have been successful in collective bargaining they have found new opportunities for the union to serve industry. In this field of collective bargaining important new trends are developing which are reflected in the five-day week goal and in wage demands based on productivity. Both these new standards represent concern that Labor shall share more fully in social progress in the benefits of improved production technique, increasing productivity, and in more leisure. These demands represent ideals of trade unionists and reflect more advanced understanding and organization of industrial relations and definite appreciation of the significance of productivity.

There has been sustained progress among organized wage earners in establishing the eight-hour day. Some unions have secured a forty-four hour week and more recently considerable progress has been made in securing the five-day week for building tradesmen.

During the past winter, when seasonal unemployment had been added to unemployment resulting from mechanization of

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industry, new emphasis has been given to arguments for shorter work hours as a necessary accompaniment of increased productivity. According to the Census of Manufactures there were for 1927 8,076,500 wage earners as contrasted with 9,096,500 in 1919, although value which they add to manufacture is 25,171,400,000 as contrasted with 25,041,700,000 in 1919.

Manufacturing industries 1919—1927.*

Year.	Total Wages.		Total Number of Wage Earners.	
1919	\$10,533,400,000	100	9,096,500	100
1927	\$10,510,000,000	100	8,076,500	89
Year.	Wage per Wage Earner.			
1919	\$1158	100		
1927	\$1301	112		
Year.	Value added by Manufacture.		Value added by Manufacture per Wage earner.	
1919	\$25,041,700,000	100	\$2753	100
1927	\$25,171,400,000	101	\$3117	113

American trade unions have officially declared that increasingly higher standards of life can be maintained only through increased productivity. This position of the American Federation of Labor has been developing over a number of years.

In the early years of the twentieth century demands for wage increases were simply demands for higher absolute wages. Next came demands for wages based upon consideration of cost living and higher purchasing power to wage earners. Then, with increasing use of mechanical power and technical progress, productivity in industries increased greatly. Workers found there were definite limits to industrial prosperity through increased productivity unless there was corresponding increase in purchases on the market. The American Federation of Labor therefore formulated a new wage policy which finds additional grounds for wage increases in the fact that they were helping to produce more and that unless wage earners shared in social progress the depression tendencies of the business cycle were strengthened. The initial step in formulation of this latest wage policy was a declaration in 1919

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pointing to the relation between research and industrial progress. In the years following were declarations pointing to the relation between productivity and wage increases and finally a formal declaration adopted in 1925:

"We hold that the best interests of wage earners as well as the whole social group are served by increasing production in quality as well as quantity, and by high wage standards which assure sustained purchasing power to the workers, and, therefore, higher national standards for the environment in which they live and the means to enjoy cultured opportunities. We declare that wage reductions produce industrial and social unrest, and that low wages are not conducive to low production costs.

"We urge upon wage earners everywhere: that we oppose all wage reductions, and that we urge upon management the elimination of wastes in production in order that selling prices may be lower and wages higher. To this end we recommend cooperation in study of waste in production which the assay of the Federated American Engineering Societies covering important industries has shown to be 50 % attributable to management and only 25 % attributable to labor, with 25 % attributable to other sources, principally managements in industries producing commodities for any single industry under consideration.

"Social inequality, industrial instability and injustice must increase unless the workers' real wages, the purchasing power of their wages, coupled with a continuing reduction in the number of hours making up the working day, are progressed in proportion to man's increasing power of production."

This policy can be applied only when workers know the facts of productivity, and it at once carries wage discussion to the realm of fact determination. The first research work which the American Federation of Labor undertook in the wage field was a study of wages as related to productivity. This study was based upon the Census of Manufactures of 1925. The Federation began in October 1927 the computation of an index of labor's share in production and consumption based upon both wholesale and retail prices respectively. This index is published monthly in the "American Federationist".

Though the entrance of the Federation into the research field is important in itself, there is added significance in the fact that the research is for the purpose of giving practical aid for handling economic problems. It will tend to strengthen the emphasis which American labor has placed upon economic methods.

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Since September 1927, the American Federation of Labor has been gathering data on employment among trade unionists. The data show the percentage of unemployment in the more important industrial centers. Local unions cooperate in the study. The data will constitute measuring rods to indicate the relative stability of employment which is an important element in annual earnings.

Another trend in the American labor movement of incalculable potentiality is the assumption by unions of various degrees of responsibility for production and the development of various types of cooperation between unions and managements.

The rejection of the theory of irreconcilable class conflict results in an entirely different mentality and vocabulary for American labor from that of European labor movements. Acceptance of the principle of interdependence of interests, makes possible the Federation's policy of cooperation with other groups to work out mutually acceptable plans for progress. The Federation through various representatives is cooperating with such widely different organizations as the American Bar Association, National Broadcasting Company, National Bureau of Economic Research, Social Science Research Council, Personnel Research Federation, Economic Foundation, U. S. Chamber of Commerce, American Legion, and many other representative groups.

This same tendency to seek a synthesis that will harmonize the views of groups concerned instead of the dominance of a single group or class point of view, is evidenced in the efforts of the American Federation of Labor to enlarge the scope of social text books used in public schools to include an impartial discussion of labor implications in history and other social sciences. In its work in connection with public schools, as well as in its promotion of adult education through the Workers Education Bureau, the Federation has maintained broad constructive purposes based upon recognition of interdependence of interests as opposed to propaganda and the strengthening of opposing interests which promote conflict between groups.

With the development of the concept that both employers and employees may benefit through the progress of the industry,

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came the opportunity for cooperation between workers and management which is the most significant development in our field of industrial relations. Cooperation between management and trade unions is a further development of joint relationships resting upon a foundation of collective bargaining. It represents a sense of responsibility on the part of wage earners for progress in industry not only as a means for betterment for the groups immediately concerned but for social progress. Responsibilities result from recognized and established rights. This sense of responsibility is expressed by unions in widely different constructive services to industry up to the more recent developments of participation in what were formerly regarded as exclusively management matters.

Lines of division in industrial conflicts have not been based upon class divisions and conflict, but on protest against temporary inequities in sharing the results of production. Since the background is not irreconcilable conflict between classes, concern is focussed upon establishing collective bargaining or developing adjustments where collective bargaining exists. In industry where traditions of employers' individualism prevent practical individualism for workers which can be realized only through collective action, issues still turn on the right to collective action through trade unions or voluntary agencies. There is a wide range in the degrees of progress represented in labor organizations in various industries.

Practically all trade unions assume some responsibility for maintaining standards of skill among their membership. Many craft unions have had provision for apprenticeship training under union control. Formerly training was within the shop, but with changes in industry, shop training has been supplemented by instruction in schools or by correspondence. The International Typographical Union and the shop crafts on the Baltimore and Ohio have developed successful correspondence courses. The printing pressmen have a technical school which also helps members with practical problems. The unions in the construction industry usually join their employers in cooperative undertakings with public schools. The trend is

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toward a wider basis of instruction to promote understanding of the industry. Encouragement for further development of craftsmanship is furnished by the New York Building Trades Congress through special distinctions for applied craftsmanship on construction undertakings. These are beginnings of an effort to replace vanishing skills by new standards and ideals of workmanship. The unions are aware of the effects of repetitive or mass production, and are considering the new production methods for the purpose of finding the type of training to substitute new standards of skill for older manual skills in order that mass production may not mechanize workers also. It is significant that American unions, as a rule, do not oppose machinery, but seek to prevent disadvantages to the workers through mechanization of industry or more efficient production methods. There has been a distinct change in organized labor's attitude toward scientific management following fundamental changes in scientific management.

In the past twenty-five years a number of organizations have been merged as production changes wiped out old craft lines. The formation of departments within the Federation was a step toward providing joint action for an industry and has brought varying degrees of unified action for the building trades, the metal trades and the railway shop employees.

Unions have given considerable thought to the complete breaking up of a craft through mass production where the worker is responsible only for a process instead of a finished product. They have given evidence in special decisions with regard to jurisdiction over automobile workers of flexibility necessary to be adapted to industrial changes.

Another and most significant development in American trade unionism is participation in the problems and decisions of management through union-management cooperation on five railroads - the Baltimore and Ohio, Canadian National, Chicago and Northwestern, Grand Trunk Western, and Chicago, Milwaukee and St. Paul, affecting 75,000 employees. The provision under which union-management cooperation was first established was a simple protocol written into the agreement between the railway shop crafts and the Baltimore and Ohio.

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This protocol pledged the union to cooperation in finding "improvements in the service and economy in operating and maintenance expenses".

For cooperation in working out better shop procedure, joint shop committees were created of the regular representatives of the trade unions and the management. These committees hold regular bi-weekly meetings and keep records of transactions. All members of the committee submit proposals, some of which may be referred to special joint committees for investigation and report. Realizing that they were entering upon cooperation in the technical field, the unions retained a high grade consulting engineer experienced in the railroad industry. Technical counsel has given the unions confidence to proceed under the agreement, for they do not feel hampered by fear that the technicians of management can take advantage of them, and they can freely give their most valuable suggestions and experience, knowing that all will benefit thereby.

The records of the meetings of joint committees show whether proposals originated with the employee group or the management group and their disposition. During the three years union-management cooperation has been in operation on the Baltimore and Ohio Railroad, more than 18,000 suggestions have been made, 16,000 of which have been adopted and incorporated in shop procedure; 500 are still under consideration, and 1,500 were dropped by mutual consent as impracticable or too expensive. An analysis of a representative number of these suggestions shows that:

51.2 per cent resulted primarily in more efficient management, initiating more efficient methods or savings in materials;

13.4 per cent affected the workers primarily, such as improvement in working conditions, better work equipment, better handling of supplies;

35.4 per cent affected both sides equally.

The nature of these detailed propositions is revealed from the

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following analysis of 2,214 propositions, which originated at 14 points on the Canadian National Railways:

Shop methods and practice	417
Repairs to machinery and plant, change in location of machinery, etc.	421
Maintenance of locomotives and cars	156
Standardizing of materials	74
Materials and supplies, storage, delivery shortages, handling, etc.	199
Manufacture of and repairs to equipment	94
Purchase of new equipment and enlarging of plant	184
Reclamation of material, conservation, stoppage of waste, etc.	85
Defective materials	29
Standardizing forces	19
Working conditions in shops, lighting, heating, cleanliness, etc.	181
Safety and first aid	81
Care of tools	40
Operation of cooperative plan	40
Bonus system and measured production	40
Alterations to standard designs for locomotives and cars	33
Maintenance of equipment costs, output records	9
Promotion of employees, hiring, wages, overtime	14
New business, prospective business cards, hotel patronage, etc.	17
Apprentice instruction	—
Cashing pay checks at plant	5
Cooperation in production, improved quality of workmanship, punctuality on the part of employees	12
Miscellaneous subjects (unclassified)	57

Of 1,057 cooperative propositions originating at five points on the Baltimore and Ohio Railroad, analysis revealed that 864 (or 81.7 per cent) originated with employees, and 193 (or 18.3 per cent) originated with the management. Further, that of 629 propositions originating on the B. and O., 13.4 per cent were jointly considered to be of primary benefit to the employees, 51.2 per cent to the primary benefit of management, and 35.4 per cent to be of equal benefit to employees and management.

Understanding of the principle that the interests of those employed in an industry are mutual has been put to a number of tests under union-management cooperation. The unions have held to their purpose even when the benefits of cooperation did not bring convincing immediate material returns. In tangible form, benefits to the workers came first through greater stability of employment and later through wage increases.

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One of the greatest hardships of the railway shop work was its irregularity. This was overcome in the following ways:

By doing all work in railroad shops, thus avoiding contracting out. Thus the industry became self-dependent and there was more employment for workers.

Being self-dependent, it was possible to develop a standard work force. Better organized work prevented peak loads for which workers had been temporarily employed and as a consequence periods of slack work decreased.

Budgeting of work and funds resulted in further improvements in work plan. Certain kinds of work and types of repair were reserved for slack seasons. Budgeting of funds created an equipment reserve fund.

The effort toward stabilization in each shop was supplemented by a placement service for furloughed men who were advised of work opportunities in other shops where they have priority before new men are hired. The unions and the management handle this transfer service which benefits the railroad by keeping available experienced workers.

As a result of these efforts to stabilize production, the railroad company saved on repair costs and frequency of repairs, and each worker gained in stability of employment an increase of two week's work yearly.

That the cooperative method has promoted good will and understanding is shown in the decrease in number of grievances. Before the institution of union-management cooperation there was an average of one grievance per year for every 58 employees, while in 1925 the average was 1 to 131 employees.

A fundamental principle involved in union-management cooperation is the sense of interdependence of interests of the whole work group, first by shops and finally as represented by the whole railroad. That industry is an associated undertaking is an important social principle, manifest under this cooperative agreement. The focus is on creative initiative which brings a spirit of responsibility and mutual concern to

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the whole work group and receives financial reward as the industry prospers. The management has been more reluctant to make public estimate of the value of cooperation, but has been unreserved in its recognition of the morale sustained under cooperation. This morale results in better service and alert concern for the interests of the railroad. Trade unionists have solicited patronage for the railroads among tradesmen and those who travel. Cooperation has opened the way for more equal relationships between men and management, which makes for confidence. The problem of measuring the benefits under the new plan is being worked out by joint committees. Since cooperation has been in effect, the shopmen have received wage increases averaging 8 per cent, the restoration of time and a half pay for Sunday and holiday work, and steadier employment, the net effect of which has been to increase their average wage increases by 15 per cent.

Experience on the Canadian National Railways is similar to that on the Baltimore and Ohio. The plan has more recently been adopted by the Chicago and Northwestern and the Grand Trunk Western.

The Pittsburgh Railways Company of Pittsburgh in 1926 entered into a cooperative agreement with the union of its employees. The street car system had to meet competition with 'bus lines and other means of transportation and realized that service was vital to success. Service is possible only through a unified group. Although operative but a short time, both union and management find the results gratifying. The machinery of cooperation is similar to that on railroads. Thus far the suggestions through cooperation include:

- Additonal service at peaks on certain routes.
- Changes in certain car-loading points.
- Advisability of an early morning car on a certain route.
- Loss of time in dropping trailers.
- Children's five-cent school tickets.
- Additional service on certain routes.
- Schedules, sanding equipment, cleaning cars.
- Thermostats, lights, switches, signals, etc.

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There are in many trade unions, developments akin to phases of union-management cooperation but lacking the same definiteness of agreement and machinery because the will and understanding of cooperation are not yet sufficiently developed on the part of management. Examples of such developments are: the Printing Pressmen's Union retains three production engineers to help its membership secure the highest standards of craftsmanship on jobs done for companies with which the unions have collective bargaining. The Photo-Engravers Union has for a number of years been urging upon employers joint industrial research for determining the relative values of materials instead of the commercially controlled service now supported by employers. This union maintains its own apprentice training schools, and establishes and maintains high standards of craftsmanship. It is a craft which is rapidly changing technique, and the craftsmen must continually learn new methods. Its local unions maintain employment bureaus and unemployment benefits.

One of the textile unions, the full-fashioned hosiery workers, employed in work that necessitates high quality standards, has assumed responsibility for supplying workers of adequate ability and for helping to develop proper work procedure and morale. The officers of these unions perform definite management functions.

The union has entered into an agreement with its employees for joint research in the industry.

A similar result was worked out by the women's garment workers' union of Cleveland, which cooperated with management in developing production standards.

A number of paper makers' unions cooperate with management in the paper mills to improve quality of work and mill procedure. An upholsterers' union proposed that the office of foreman be abolished and that the union assume responsibility for managing the shop.

Federation headquarters is continually finding new examples of the constructive work of trade unions. For example, a conference on the elimination of waste in industry held in Philadelphia in 1927 under trade union and workers' education

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auspices, disclosed in a striking way new examples of the service unions render to industry. Employers, technicians and trade unionists participated in a discussion of how wastes could be eliminated. Reports on undertakings in progress, given by these groups from different approaches, all indicated a common interest in promoting better management within industry. That the more efficient management depends on the cooperation of all associated in the undertaking, is a principle which this conference helped to impress upon employers and employed alike. The papers and discussions of this conference were published in the official journal of the American Federation of Labor and in reprint form were made widely available to workers, study groups and trade unions.

Practical cooperation for the elimination of waste such as constituted the discussion in this conference is possible only through trade unions after collective bargaining has been established. When terms of work have been mutually determined, and agencies for adjusting grievances have been established, a basis is laid for that spirit of confidence and good will which make possible a focus of attention and energy upon work itself. This attitude makes for the release of creative energy upon a joint problem, a real work partnership, all contributing, according to capacity, to the joint undertaking. Then only will the work lives of wage earners reach to the levels that should characterize all human experience. Each constructive effort of the union to assume a responsible share in production is evidence of a creative urge that finds expression when the spirit of cooperation replaces opposition or arbitrary management. But this spirit is possible only when there is freedom and organization for cooperation upon a mutual basis. Union representatives have served on committees created under the Department of Commerce for the development of simplification standards and for preliminary planning necessary for the elimination of duplications and wasteful practices.

There are, in the United States, industries which, while they prefer a more limited form of organization than that of the trade union, nevertheless acknowledge the need of a method

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of mobilizing the work forces. Management in some of these industries has extended its scope to provide employees organizations. In some cases the corporations refused to permit their employees to unite in standard trade unions and for this reason trade unions have called this form of organization "company" unions and have applied this same term to all plans for employee representation that do not originate entirely from the initiative of the workers and are not connected with the trade union movement.

The company union is found chiefly under corporate types of industrial organizations where management was early recognized as a separate function from ownership and hence has developed a more highly organized technique. Some managements have felt that this more restricted form of organization is necessary to get the cooperation of workers in more efficient production. The American Federation of Labor holds that this can be done equally well through trade unions, and asserts that only through trade unions can industrial and social standards be kept uniform throughout the country. Such standards are important for the industry, the workers and society.

An agreement recently signed by the Amalgamated Association of Street and Electric Railway Employees of America and the Trade Union of Street Railway Employees is significant as to future possibilities. The agreement provides for a merging of the methods of cooperation through a company union plan and the other functions of trade unionism as carried out through the standard trade union. The result should mean the utilization of the best in both developments.

The capacity of trade unions to perform constructive service in industry, and to assume greater responsibilities, together with evidences of the social and economic value of union-management cooperation, constitute a challenge to the company union theory. Union-management cooperation gives evidence of capacity to develop between management and workers a spirit of real partnership in the work of the world. It is based upon an understanding of the interdependence of human interests and responsibilities, and at the same time safe-

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guards ideals of voluntarism which underlie human freedom and opportunities for continued growth.

As American trade unions have been successful in promoting the interests of their members, they have become important investments of both energy and accumulated revenues held for specific purposes. This stage of development means it is necessary for the union to realize management and entrepreneur problems.

In addition to investments in offices, old age homes, labor temples, labor banks, etc., unions have developed insurance companies. The two most important are The Union Co-operative Insurance Company and the Union Labor Life Insurance Company. The former was organized by the International Brotherhood of Electrical Workers to provide benefit services for their members and families. The latter was organized after careful investigation by the American Federation of Labor to enable unions to have a better financial basis for benefits, many of which are not on an actuarial basis. Increased responsibility made union officials look for better handling of finances, more accurate accounting and sounder policies.

In dealing with this problem the unions have followed their traditional policy of relying upon union resourcefulness rather than asking for legislation or governmental insurance.

It is significant that in dealing with problems of investment and management the unions are increasingly turning to technical counsel. For banking and insurance undertakings, technicians are employed. For research and for special problems, the unions are beginning to employ technicians. The leadership of President Green has given a new emphasis to efforts to promote mutual understanding in industry and to the function of fact-finding in promoting this end. Mr. Green has repeatedly declared unions must rely upon educational methods for future progress, and he has given unreserved support to the advancement of worker's education undertakings so that there may be a more comprehensive understanding of union problems and thereby a more effective development and application of constructive methods.

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During the past winter there has been a striking application of educational methods to concrete labor problems in a series of unemployment conferences organized by the Workers Education Bureau. In these conferences representatives of various community groups have met with the workers to discuss the causes of unemployment and its prevention. The conferences have served to emphasize the need of the community and labor for facts to indicate industrial trends and mutual concern for the hardships growing out of unemployment. Unions have as a result turned to the problem of stabilization with new expectations.

The Workers Education Bureau itself, sponsored by the American Federation of Labor, is tangible evidence of the new dependence which American trade unions place in education. The Bureau is helping to provide trade unions with opportunities to equip themselves to approach labor problems as opportunities for progress.

In its contacts with labor movements of other countries the American Federation of Labor is following the same instinct for functional relationships that it has followed in other matters. It has economic development as the basis for its relations with the workers of Canada. There is a definite unity in the economic interests of Canada and the United States, which has its roots in geographic continuity, economic resources and financial interdependence. Jurisdictions of unions of workers in industries generally include both Canada, Porto Rico, the United States, and sometimes Mexico. There is organizational inter-connection between the American Federation of Labor and the Canadian Trades and Labor Congress, with functional division of responsibility on a continental basis.

There are both economic and political reasons for close interdependence of interests of all countries of the Western Hemisphere which governmentally is expressed in the Pan-American Union and from a labor point of view in Pan-American Federation of Labor. This organization was primarily due to the effective support which the American Federation of Labor gave the workers of Mexico in their recent revolution to restore constitutional government in Mexico. As labor or-

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ganizations in Latin American countries are not as yet well developed, the Pan-American Federation of Labor serves as a clearing house for information for workers in those countries which are trying to build up labor organizations. The Mexican Federation of Labor has utilized the essential fundamentals of the American trade union movement and adapted them to Mexican conditions. Methods and practices of American trade unions will thus have a determining influence in shaping the development of the labor movement of the Western Hemisphere. These regional developments should lead logically to international relations when a mutually satisfactory basis can be reached.

Progress in accord with the high ideals expressed in official declaration is not uniform among American trade unions, but it is of significance that such ideals are shaping the progress and development of the American trade union movement. They forecast the future.

SOCIAL AND ECONOMIC BACKGROUND

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America has inherited most of its economic and social philosophy from Europe. Capitalism with its recognition of private property, industrial law with its doctrine of master and servant, the factory system with its concentration of population, trade practices, the wage system, and social customs with their inequalities of position and standards of living - all were transplanted to American soil from Europe. The subsequent growth of industrial society in America has been therefore the application of inherited principles to a new environment. Changes wrought have been mainly those which grew out of new situations. Because of early isolation, the bonds of tradition were less potent and new viewpoints in government, education, and industry were easily adopted. Those industries which had already become set in their traditions, notably textiles, have been the slowest to accept new methods. These adaptations in the social and economic philosophy that came to America from Europe have amounted to the development of a new spirit, a new point of view and a distinct identity.

The United States is yet a youthful country with vast possibilities. An over-crowded Europe sent her people to develop the bounteous gifts placed by nature on the American continent; the use of these gifts will be determined in the future more than in the past by international considerations. Natural and inherited endowments, unique in history, combine to make the United States a perpetual debtor to the world. For the stewardship of this nation, the child of Europe, during the short century and a half of its existence, there is no ground either for apology or for boasting, although the vastness of area and resources sometimes excites extravagant words of description. Rapid development with its frequent revolutions in modes of life has given birth to an exuberance frequently viewed at home and abroad as arrogance.

Many have attempted to generalize about the United States and to reduce the picture to a simple formula. There are those who understand the United States only as a country

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of mechanical people, of mass production and of adding machines for counting dollars. Others see in modern industry the road to a social order in which comfort and leisure will have entirely replaced misery and toil. Both these views are, of course, extreme. Certain it is that industries in the United States today contain all degrees of development from that of the pioneer industry up to the highly refined scientific management. In the cotton industry alone the entire range of conditions is to be found and in the coal industry some of the methods are most medieval. There is a long road yet to travel in raising to a respectable standard some of the backward industries.

Perhaps as wide a variety of geographic, climatic, and environmental influences exists in this country as in all European countries combined. It is often overlooked that in the majority of our states agriculture still stands as the leading industry. The large industrial cities in which visitors from other countries usually obtain their impressions are happily not yet representative of American life. In 1925, 45.6 per cent of the population was rural, living outside of towns having 2,500 inhabitants or more.

It is impossible in this paper to present an adequate picture of what the United States has been or is today, but a short review of historical events followed by a consideration of fundamental changes may provide a background for the industrial movements described in the accompanying papers.

What are fundamental relationships within industry in the United States? Certainly they include questions of ownership, functions and status of persons engaged in industry, methods and procedures of work, division of the rewards, distribution of products and the consequent effect of the entire industrial process on social standards.

Until a half-century ago agricultural economy was predominant in the United States. Great reaches of land spreading to the west offered a livelihood to any energetic man with a team of oxen, an axe, and the strength to meet the open country. Life was simple and circumscribed; necessities

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were produced at home by painstaking effort and in small quantity. Altogether existence was so primitive and individualistic that it could not fail to leave its mark on later periods. Gradually there developed trade between the western settlers and the eastern markets on the Atlantic seaboard. Industrial expansion, proceeding slowly and in face of opposition from the southern planters, received great stimulus from the Civil War which shifted political and economic power to the northern states.

This was only sixty years ago. The thirty-one million people then making up the population were concentrated chiefly in the east and the New England states were the center of the meagre industrial life of the period. Steam had largely displaced water power in manufacturing plants but the use of electricity was as yet unheralded. The construction of railroads had barely begun. While most of the important cities were thus connected, the horse and carriage or wagon was still the mainstay of transportation. Most of the major fields of industrial development had been tapped but none of them had really got under way.

With the turning of attention in the late '60s from internal warfare to reconstruction pursuits, everything favored industrial expansion. The steam railroad had passed through its experimental period and was ready to push its lines across the continent. Within the boundaries of the country lay rich deposits of coal, iron, copper, gold, silver and petroleum; untouched forests covered the hills; the fertile soil of the plains was able to support millions of people; abundant water power was available in many regions.

Not only were the resources of the country unexcelled but there was a minimum of restrictive influences on their exploitation. Pioneer conditions still prevailed under which individualism flourished. Where all stood a chance to win, no one wanted to set up hazards and cramping conditions. A friendly government acted as a powerful agent in speeding industrial development through low taxes and a high tariff. Labor was as yet unorganized. Never has there been such a paradise for the individualistic industrialist.

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A certain ruthlessness and carelessness of social consequences characterized the period from the Civil War, 1866, to 1900. Natural resources were wasted with utter disregard because such a course was the immediately profitable one. Little attention was paid to working conditions; both employers and employees worked long hours; labor disputes grew in number and in violence.

Industrial expansion was accompanied by and was largely dependent upon an increase in population, an increase accounted for in part by the millions of Europeans who came to this country to help settle its lands and take part in its industries. The early immigrants were largely from the British Isles and northern continental countries, while in recent years those from the southern countries and Russia predominate. Largely through the efforts of organized labor this influx has been reduced within recent years to small proportions.

The growth of basic industries tells the story of the economic development of America. Agriculture, lumbering, mining, transportation and communication underlie all industrial and social life.

There are approximately one and one-half billion acres of actual and potential farm land in the United States. By 1860 something over 400,000,000 acres had been placed under cultivation. Between 1860 and 1900 another 430,000,000 acres were added. Some of this land on the margin of economic utility has since been abandoned. There are yet over 600,000,000 acres of potential agricultural land, much of it fertile, which needs only clearing. Because of the relative ease with which land could be obtained, independent land-owning farmers have prevailed. Farm labor has been at a premium partly because any aggressive worker could within a short time get a piece of land of his own and partly because industry offered attractive inducements. Agriculture was thus forced into economy of labor rather than of land. Scientific agriculture and the use of motor power and machinery increased the output, in the period 1920-1926, of the American farmer in spite of the fact that the farm population had decreased.¹

¹ Frederic W. Wile, editor, "A Century of Industrial Progress", New York: Doubleday, Doran & Co., 1928, p. 9.

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The place of lumbering in American life is often overlooked. Wood is basic or important in more than half of our industries. There is used in the United States six times as much lumber per person as is used in Europe and more saw timber than all the rest of the world combined. More than a million people are employed in lumbering and wood working industries.

It has been said that "the development of the mind perhaps is what sets us off from other animals, but it is only man who uses minerals and without them he would have neither the means nor leisure for mental culture. Except for the minerals and the art of mining and metallurgy founded on them, there could be no civilization". Certainly, without enormous supplies of coal, petroleum and the metal ores, iron, copper, lead, gold, silver, and others, present-day civilization in America could not have been developed. With a population of 120 million, the work output of the nation, derived mainly from mineral fuel, is equivalent to a population of four billion million hand laborers. Although there had been some mining in the Appalachian mountains and the Piedmont plain of the east, it was not until the discovery of gold in California in 1849 and the subsequent discovery of other metals in the Rocky Mountains and Great Lakes regions that the exploitation of minerals, unprecedented in world history, took place. Thus there was available material which made possible the use of machinery, power, and rail transportation when the great industrial development of the late nineteenth century took place.

Just as transportation facilities have made possible the exploration and development of new lands throughout the world so in the United States the spread of population and industrial expansion have depended in rapid succession upon the railroad, the automobile, and now conceivably upon the airplane.

Life in the United States before the extension of railroads in the '70s and '80s was vastly different from that of the last quarter of the nineteenth century. Railroads made possible the bringing together of coal, ore and lumber to the

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centers of manufacture usually located at places which nature had provided as logical transfer points. Here developed the industrial cities where ships met rails. Later there grew up inland other cities nearer the supply of raw materials and power. Centers of distribution were established which facilitated the further increase of agriculture.

While steam transportation was in its heyday, a new fuel was being developed from the recently discovered petroleum. Life was again revolutionized in America by another means of transportation - the automobile, an invention from Europe. 1900 to 1910 witnessed the establishment of the automobile industry among the leaders in manufacturing. Eventually a hundred million people took to the road. An automobile for every seven persons now makes possible the movement of the entire population at one time. The significance of the automobile in social life is enormous. For millions the center of recreation has been shifted from the home to the countryside and pleasure resorts. Daily life has become more complicated by increased speed and multiplied contacts of people. What the effect of air transportation will be is beyond calculation.

It is impossible to dissociate from transportation the telephone, telegraph, wireless and radio transmission of messages. The use of these means of communication goes hand in hand with increased speed in transportation, in reducing the time required for transacting business, or for making a social call. Together they amplify haste and tensivity in doing things and are a symbol of American eagerness for physical progress.

The foregoing time-sketch of industry in the United States leads to a consideration of certain basic movements in present-day industry. Changes in structure of business organizations, changes in methods of operation, and changes in the status of participants, go on apace. These constitute a continually evolving set of "fundamental relationships". They take form in three broad trends which condition all other industrial currents. First, there is the shift from individualism towards collectivism. Ownership and operation of industry is no longer a matter of individuals but of groups. Second,

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mechanization is rapidly replacing handwork in manufacture. Third, there is the emergence in importance of the worker himself individually and collectively. These three trends are interdependent and are in varying degrees both cause and effect.

Changes in organization and structure of industry have been predominantly in the direction of large unit administrative control with a consequent increase in the importance of large companies. Not only has this meant the readjustment of internal organizations; it has also brought forth extreme interdependency between companies and industries.

Concentration and control of industry in the United States was made possible by the legalizing of the joint stock corporation with limited liability. Under this form of organization, combinations of small units became numerous in the latter part of the 19th century in order to take advantage of the greater economies of centralized control. In the early years of this trend abuses of the newly acquired power appeared. Anti-trust laws were enacted for the preservation of competition through the prevention or restriction of monopoly. These laws have in recent years come to be retarding forces in the efforts of American business to reach more of the world's markets. They have also become important factors in limiting the action of labor unions.

Under the stock company, ownership has become widely scattered. Three forms of financial control are now exercised in the United States: individual ownership; majority stock ownership; and minority stock ownership. With the diffusion of ownership, an active minority group usually interested solely in financial rewards finds little difficulty in manipulating operations to meet its own ends. Happily, however, the increasing power of management basing its decisions on research and a growing code of industrial ethics is slowly but surely putting control on a different plane. Control dictated by the facts of the situation is replacing control based on ownership.

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With the spread of stock company form of organization, industrial financing has been nationalized through the passage of the Federal Reserve Act. This Act has served as a stabilizing influence while at the same time it has facilitated the flow of capital to the places where it is most needed.

Another evidence of consolidation is in the trade and business associations, of which there are about 9,000 now in this country. The co-operative programs of these organizations are a unifying force of deep significance. Simplification of practice and materials, uniform cost accounting, elimination of waste and other activities are promoted by committees and staff specialists through well developed educational procedures. The Federal Department of Commerce has led the movement for economic planning toward the prevention of industrial waste. As contrasted with the use of legislation alone, this functional cooperation between trade associations and the Department of Commerce may mark the development of a new governmental method.

These changes in the structure of industry have been themselves mainly changes in relationships. Community of interests has brought together larger and larger groups of people. The joint enterprise is outstripping the individual undertaking. Public interest has been read into practically all forms of private property and what is even more important, the directors and managers themselves have recognized the claims of society in industry. This conclusion is eloquently attested by one of America's leading industrialists who said a year ago:

"We think of managers no longer as the partisan attorneys of either group against the other. Rather we have come to consider them trustees of the whole undertaking whose responsibility is to see to it on the one side that the invested capital is safe and that its return is adequate and continuous; and on the other side that competent and conscientious men are found to do the work and that their job is safe and their earnings are adequate and continuous. Managers may not be able to realize that ideal either for capital or labor. It is a great advance, however, for us to have formulated that objective and to be striving toward that goal." ¹

¹ Owen D. Young, address by, given at the dedication of the new buildings for the Harvard Graduate School of Business Administration, June 4, 1927.

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Looking into the industrial organization of the future this same man has said:

"Perhaps some day we may be able to organize the human beings engaged in a particular undertaking so that they truly will be the employer buying capital as a commodity in the market at the lowest price. It will be necessary for them to provide an adequate guaranty fund in order to buy their capital at all. If that is realized, the human being will then be entitled to all the profits over the cost of capital. I hope the day may come when these great business organizations will truly belong to the men who are giving their lives and their efforts to them. I care not in what capacity. They will then use capital truly as a tool and they will be all interested in working it to the highest economic advantage. Then an idle machine will mean to every man in the plant who sees it an unproductive charge against himself. Then every piece of material not in motion will mean to the man who sees it an unproductive charge against himself. Then we shall have zest in labor, provided the leadership is competent and the division fair. Then we shall dispose, once and for all, of the charge that in industry organizations are autocratic, not democratic. Then we shall have all the opportunities for a cultural wage which the business can provide. Then, in a word, men will be as free in cooperative undertaking and subject only to the same limitations and chances as men in individual businesses. Then we shall have no hired men."

Although this goal is yet a long way from realization, it is significant that such a statement should be voiced by a prominent business leader at the dedication of a school for the training of business men.

Changes in methods of production which have occurred in the United States are but a natural outcome of the extension of the factory system with its automatic machinery in an environment of limited labor supply and vast resources. When the factory method of production became general in the United States less than one hundred years ago, two conditions facilitated its extension and development on lines somewhat different from those which had previously developed in England and the European mainland, namely mobility of population which permitted the placing of factories at strategic geographical points and the existence of enormous sources of power from both water and coal. When the hardy pioneers undertook to utilize the resources, America was ready to cut

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and use the new patterns without having to discard the old ones. Already the idea of invention of mechanical devices to take the place of hand labor was widespread before the American wilderness was thoroughly explored. When the early industrialist met new problems of nature he literally met them with a machine as contrasted with the hand tool of former days. In a country where land, minerals, and power have always been more abundant than labor to exploit them, the stimulus has been to invent more and more labor saving devices. This disparity between manpower and opportunity has probably been the most potent force in the mechanization of industry in America.

Research and mechanization go hand in hand. Among the various aspects of their interrelation are discoveries in pure science, invention, industrial research, industrial application, and standardization. These exhibit interaction and combined are responsible in large measure for whatever success has been had in meeting problems and opportunities in this country.

Although there have been notable contributions in pure science in this country it has been principally in the stages of invention and application that the greatest progress has been made in the United States. Well over \$100,000,000 is spent here annually for industrial research.¹ Hundreds of laboratories are now to be found in industrial companies in which new products, new tools and new processes are being created. Research has been the prime agent in creating within a short period of twenty or twenty-five years such major industries as the automobile, motion picture, radio, and chemical and electrical products. The individual researcher has in numerous cases given way to organized research in which a single project is divided among a corps of specialized investigators. Although industrial research in America is probably only in its infancy its effect has already been conspicuous. An entirely negligible proportion of expenditures has been on research in industrial relations and problems involving the human factor in industry.

¹ Maurice Holland, "Research the Prime Mover of Industry", *The Scientific Monthly*, Vol. XXII, No. 4, Whole No. 127, April, 1926, p. 297.

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Yet certain leaders are beginning to sense the possibilities in this direction and are taking steps to explore them.

Not alone are new industries created but per capita production is increased. Notwithstanding a reduction in hours and days worked of roughly 10 per cent since 1914 there has been an increase of 40 per cent in output per worker. One typical illustration is that of a plant making automobile tires. In 1920 the daily output was 30,000 tires by 30,000 employees; in 1928, 16,000 men produce 50,000 tires daily and other products in proportion.

Mechanization is not merely a machine, it is an idea. When a chemical process is discovered which brings under control hidden forces of nature, when a procedure of management is devised which works automatically, there is mechanization as surely as if a machine were invented. Planned control of manpower, materials and machines is the vital coordinating agent of management in mechanized industry. Mechanization of a job frees men in industry for new fields to conquer with mind and hand. Not only is this new freedom come to the manager interested in reducing costs but also to the worker who formerly took hours, days or months of arduous and often worrisome labor to produce an article which now rolls out of the machine in large numbers better made than by former handwork.

Automatic machinery and the use of nature's power and materials have made possible increased worldly comforts for all mankind. Certainly there is now more inclination on the part of American workmen who have tasted abundantly the fruits of mechanized industry to accept each new automatic device as an added opportunity for greater freedom from physical discomfort and perhaps from intellectual bondage. Occasionally, however, there is heard a warning that mechanization is proceeding too rapidly and resulting in unemployment. Certainly in the United States there is an abundance of unemployment continually arising from the increase of labor-saving machinery. There is ground for the belief that this unemployment is created only temporarily, if at all, in those industries which have extended the use of the machine

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and that the more serious unemployment occurs in the industries whose markets are diminished or destroyed by mechanized competitors. This is yet an unsolved problem which needs to be met openly.

Experience has demonstrated so convincingly the social results which come from the conquest of the forces of nature, that there is in this country no limit to the imagination of the masses of the people as to what may next appear. The three or four generations which have been engaged in the industrial development of a new country are not enough to crystalize habits of thought or to form a routine civilization. The only thing to which Americans are thoroughly accustomed is change itself.

The relatively high purchasing power of the population as a whole permits the marketing of new products which in turn stimulates production. Mass buying at low prices is made possible by mass production. The economic cycle in which the worker is both a producer and a consumer can only continue upward as long as the balance is preserved and efficiency of production increased. Thus the constant pressure for lower production costs leads to more research. The belief of business men of the United States in the efficacy of research and their willingness to invest money in it will go a long way toward keeping the workmen of this country regularly employed while enjoying the highest standard of living ever attained by an industrial population.

Changes in the status of participants in industry have been the inevitable outcome of changes in organization structure and methods of work.

Wage-earners are increasingly being given opportunity to share in management and to assume the responsibilities of partners in industry. Managers are becoming detached from ownership and are developing an independent position. Owners have already lost much of their identity as individuals responsible for specific companies. Capital is more and more the servant of management, working for its wage. Employees own billions of dollars worth of stock directly in their own and

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other companies, and indirectly through savings banks and insurance companies. Such ownership, however, does not carry with it control over operations which, as previously indicated, is commonly lodged in minority groups but increasingly in management.

Feudalistic paternalism does not flourish under the joint stock company form of ownership. Although many family-owned companies still exist, they are exceptions to the common rule. The employee is beginning to exercise his right to a voice in the conduct of industry.

Furthermore, the separation of management from ownership promises the emergence of a group of professional managers. It has opened the way for an industrial code in which the spirit of trusteeship may predominate.

The specialization of functions and tasks in industry has brought forth the workman who is skilled in closely defined operations as contrasted with the jack-of-all-trades. Craftsmanship in the sense of ability in one man to make a complete product has practically disappeared but craftsmanship involving precision and perfection has taken its place. There has been much romancing about the destruction by the machine of the spiritual values of medieval craftsmanship. The story of the man who adjusts "bolt 476" in the Ford factory has been sadly overworked. Such viewpoints overlook the fact that a very small fraction of American industry uses the belt conveyor system and that relatively few machine workers are doing work which requires repetitive motions. It is conspicuously in the handwork industries that sweatshop conditions have prevailed - witness the needle trades where mechanization proceeded slowly. Monotony and over-fatigue do exist, however, in machine industry just as they did under the long hours of drudgery before the industrial revolution, and just as they exist today among the rug makers of Persia. These evils obviously must be reduced but the agent for such improvement will probably be more machines and more mechanization rather than less, accompanied by a more effective regularization and use of existing equipment.

The vast changes in methods which have become so con-

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spicuous in American mass production can not conceivably be expected to satisfy the conception of spiritual values which prevailed under an altogether different social order. It would seem obvious that spiritual values are distinct from the tools and products of man. Man's heart is just as black using an ancient sword as a modern machine gun and just as full of inspiration with a modern riveting machine as with an ancient hammer. Craftsmanship in mechanized industry depends for its spiritual values upon the inner man just as in the days "when knights were bold". And who is there to say that the shorter working day and other manifold fruits of science in industry through use of the machine have not opened the doors for millions of people throughout the world mentally, morally, and physically?

The modern problems of machine industry are rather of another kind. How shall man use his leisure time under the shorter working day? How shall the rewards of cooperative effort be more equitably distributed? How can the concept of stewardship be further developed in industry. Can an industrial government improve upon the now traditional forms of democratic political government? These are the unsolved puzzles which completely over-shadow the unimaginative cry against the machine which yet awaits its most intelligent use by man.

It is the search for this intelligence which commands the attention of the five modern movements described in this symposium. Each of these movements is an outgrowth of the environment and background in which it rests. Singly and collectively, they represent constructive forces of America for development of healthy social, political, industrial, and educational life in an industrial civilization.