addresses were an effort to win acceptance by owner-managers, the group then having sole administrative responsibility for organization in industry, of the new concept and technique of scientific management by appeal to their dominant interest in the immediate and practical problem of high productivity at low cost. These addresses therefore emphasized means in detail and ends only in general; ends such as low labor costs, high wages, sympathetic understanding between management and workers, and industrial prosperity;[7] means such as research, standardization, functional organization, functional supervision, time and motion study, planning, predetermined tasks and differential rewards. The social point of view in these addresses was that if means were accepted the ends would be realized as a matter of course. Therefore the emphasis on these arguments was on means.

In general the industrial culture of the time[8] was one in which managements were interested primarily in productivity. It was a virile industry in which proletarianism was not yet conspicuous; an industry of splendid personal generosity and helpfulness in times of stress, but without much institutionalized humanitarianism. Such concepts as "welfare work," "personnel management," and "industrial relations" were not yet prevalent. It was a period of industrial surge which continued the revolution that had been dramatized in the war between the States (1860-1865) and had firmly established capitalistic industry behind bulwarks of favorable banking, tariff and immigration legislation.[9] The commodity theory of labor was a logical doctrine of the time. Notwithstanding occasional panics and depressions it was a period of that intense activity now called a "seller's market." Therefore generally the problem of management was one of production; high production and low labor costs were the dominant interests. The early expounders of scientific management knew their industry and appealed to these dominant interests. Yet in practice, as we have said, from the moment scientific management gave attention to the stabilization of the workplace and shop the problem of personal relations also received special attention. This attention has increased as the years have passed and new problems come to the fore, and now gives scientific management a commanding position in the world campaign for improved human relations in industry.

There were two reasons for immediate practical attention to this phase of the stabilization problem. First, technically it was perceived that the relations of men to tools, machines, management and each other were an integral part of the management problem at the workplace and throughout the shop, and that stabilization of facilities could not be separated from stabilization of the relations between them and the users; second, philosophically and ethically scientific management had its origin in a specific ambition of Taylor's to better human relations in industry.

It had its origin in a problem of human relations when Taylor as a young, inexperienced foreman encountered his first and last controversy with workers under his supervision. This experience distressed him; "The life was a miserable one, and I made up my mind to either get out of the business. . . or to find some remedy for this unbearable condition."[10] The remedy, he decided after giving thought to the matter, was knowledge, facts laid on the table for all to see, instead of guess and whim and autocratic force. The way to knowledge, he decided also, was through investigation and experiment. In this way scientific management—inductive science in management—had its small beginnings exactly fifty years ago.

Although he did not emphasize it in his early expositions—explanation of the end would have been so far in advance of the time as to have generated sales resistance to acceptance of the means—this objective inspired Taylor from the beginning. It has continued to inspire the whole scientific management movement. The following is a fairly accurate ranking of the interests of Taylor and his successors, each item conceived roughly as contributing to those which precede it in the list: human welfare; harmony in industrial relations; an equitable division of the social income in fair profits, high wages and low prices; high productivity; perfection in management; science in management. In the early addresses, however, notwithstanding an especial interest in those items which are primarily ends, for reasons which we have already explained, emphasis was placed on those which are primarily means.

The attack by organized labor upon the scientific management concept in 1910-11, and for a few years following, may now be dismissed as inconsequential. It did not arise out of any unfavorable reaction of workers in scientific management plants. It was *a priori*, speculative, doctrinaire disputation which arose out of failure to understand scientific management as a doctrine. This must be charged in large part to the omission of emphasis on ends in the early literature. Several years of this disputation, characterized by a smoke-screen of nebulous assertions, was succeeded by revealing experience with scientific management in war-time production; and by the end of the World War better understanding of the objectives as well as the details of scientific management led to passive, and in some instances active acceptance by organized labor.

Technically the problem of stabilizing human relations in American industry in the early days of scientific management was much simpler than it is today. The emotional nature of man did not occupy so large an area of the problem, and group emotions especially were not yet an important factor. Even such individual emotions of men as are today presented in the feeling of industrial insecurity did not play a large part. The workers, like the employers, felt reasonably secure and were interested primarily in raising their standard of living. They wanted employment—which was usually to be had—and high wages, for these made possible "the full dinner pail," a favorite expression of the time. They wanted good working conditions, but this was not emphasized, for "conditions" are relative, and working conditions as they found them were less disagreeable than those of the woods and farms from which the native workers had come, or the European industrial cities from which the foreign-born had emigrated. To immigrants of that day America was the "land of prosperity and opportunity." Therefore the problem of human relations centered about increase in the standard of living as a fulfillment of this promise of opportunity and prosperity.

Scientific management at first made its immediate objective a recognition of this common motivation. "High wages and low labor costs" was an appeal[11] to the same dominant emotional interest in workers and owners. Productivity became the first and fundamental problem of human relations. This was possible for an enterprise in competitive industry only if there were greater productivity per unit of human energy and of capital investment, which in turn was possible only by discovery of better facilities and methods, and making these effective in a stabilized system of co-operative effort.

The first step in development of the technique of scientific management was "job analysis," although this term had not been devised. These early job analyses differed from those of modern personnel managers in a very important respect: instead of being analyses of jobs as they are ordinarily performed, they began with experiments to determine the best facilities and methods for a job, and then followed analysis and standardization of these perfected methods.

These early analyses were studies of machines in use, and were therefore studies of operators and their methods as well as machines and their tools. The human factor stood out at once as of primary importance. To establish the most perfect conditions in their totality at a workplace it was perceived that it was necessary to select workers for particular jobs according to their native capacities and acquired skills, train them, inform them concerning the detailed requirements of each operation and the relations of operations, and win and maintain their sympathetic interest and good-will. Thus simultaneously with attack on the problem of stabilization of the workplace through perfection of equipment, scientific management, because of inherent principles, was compelled to give attention to the total situation, involving men as well as equipment.

The practical outcome of these early studies was that then, for the first time in American industry, began systematic care in the selection of workers—such as keen, intelligent men for skilled machine work and strong, lethargic men for monotonous shoveling and lifting. Then began systematic training through especially selected and functionalized foremen; the giving to workers of complete information through written instructions in place of abrupt commands; and special assistance to workers through provision of the necessary perfectly conditioned tools for each job. Investigations of fatigue were made which rank with those of modern psychology, and working conditions were defined accordingly. A systematic relationship and procedure was devised which insured competence, understanding and the necessary facilities. The result was increased productivity, higher earnings, lower costs. The full dinner pail of the worker was made fuller, and the profits of the enterprisers were increased. Thus were co-operation and good-will estab-

[7] Taylor, Frederick W., "A Piece Rate System," *op. cit., passim* and *Shop Management, op. cit., passim.* Gantt, Henry L., *Work, Wages and Profits, op. cit., passim.*

[8] 1885-1900.

[9] Beard, Charles A. and Mary R., *The Rise of American Civilization, op. cit.*, Ch. XVII.

[10] Copley, Frank B., *Frederick W. Taylor, Father of Scientific Management, op. cit.*, Vol. I, pp. 4-6, 137-189, also Person, H. S., "Scientific Management," *op. cit.*

[11] Taylor, Frederick W., "A Piece Rate System," *op. cit.* p. 12; Taylor, Frederick W., *Shop Management, op. cit.* p. 22.