tion drifted to the subject of agreements between his union and the hat manufacturers. I seized the opportunity of asking whether, in his long experience, these agreements had been based, in any instance, on a scientific survey of the hatting industry. Had information been available, for instance, to prove that management in the industry was generally efficient? Were wage contracts established on a foundation of revealed costs? Had price lists ever been based on accurate knowledge of the amount of product a skilled worker could turn out in a given time under the best conditions? Were the latter scientifically on record? Had there ever been a concerted effort on the part of the United Hatters and the Manufacturers to eliminate unnecessary waste in the industry, so that the best balance of wages, hours and conditions might be intelligently maintained? The answer to these questions was a gigantic "*NO*." "Moreover," added my friend, "we have continually sought from the employers just the sort of knowledge that you describe, but in no case has it been forthcoming. Either they do not possess it or are willing to give it out." Briefly, information necessary to the negotiation of an intelligent agreement was not available, or if available was being withheld by the manufacturers. Instances like this—and they are typical in greater or less degree of industry as a whole—have convinced me of the utter necessity from organized labor's standpoint not only of job study, but of labor's active participation in the conduct of job study.

In addition to this material justification, however, there is another reason for the participation of workers in job study, a more intangible reason, perhaps, but of boundless importance nevertheless. It is this. As industry is now organized, only by such participation can workers gain any freedom of initiative in the creative aspect of production. This idea may be expressed perhaps with more clearness as follows. In view of the great scale on which industrial operations are now conducted, and in view of the extent to which division of labor and specialization are now carried, only by some form of participation in job study can workers gain any opportunity for necessary self-expression in their daily work.

Let me review very rapidly the evolution of industry during the past century or more. The industrial revolution of the latter eighteenth and the nineteenth centuries eliminated from our life the domestic manufacturer and the handicraft journeyman, both of whom owned the simple tools with which they worked, and gradually developed in their stead a small body of capitalist employers who possessed the newly invented machine tools, and "who employed at wages a constantly increasing mass of propertyless workers struggling," as Beatrice Webb tersely puts it, "like rats in a bag for the right to live." The worker who in the era of handicraft had opportunity to express his individuality in the excellence of his product and who thus, in a certain sense, dominated the exercise of his craft now became the servant or at best the adjunct of a machine to which the skill of handicraft, in the logical course of mechanical progress, had been gradually transferred. Throughout the nineteenth century industrial plants increased greatly in size; division of labor or specialization, as it is usually termed now, was developed to an extraordinary degree; machines were invented to perform each of a great variety of stages in the manufacture of a product and the worker now found himself not only the servant of a machine, but working on the tenth or hundredth or thousandth part of the product instead of on the entire product as formerly. The latest phase of the industrial revolution was entered in the last decade or so of the nineteenth century when industrial engineers, confronted by the vast complication of modern industry and by the great menace of industrial waste, developed the nucleus of a new science of management. The technique of this new science was quickly seized by employers who because of inexperience, inadequate knowledge, lack of patience or sheer cupidity too often made it a means of further degrading and exploiting the worker's function.

This brief historical survey is important because it indicates the manner in which increasing specialization in modern industry has tended to narrow, to virtual disappearance, the average worker's scope for creative self-expression in his daily work. It is with the more advanced phase of the industrial revolution, however—the recent development of a management science—that I am mainly concerned throughout this paper. For job study is a fundamentals element in this science, and as I have mentioned, I believe that only through active participation in job study can workers recover a measure of the old initiative, pride of craftsmanship, or whatever we choose to call it, that for more than a century they have been steadily losing.



I have referred to the fact that the new technique of management was quickly seized by employers and that in some instances this resulted in a deterioration of the job from the worker's point of view. I think I can best illustrate this process by delving back into my own past experience. In the year 1911, just at the time that the new scientific management technique was gaining considerable headway throughout industry, I obtained employment as a lathe hand in a large automobile plant in Detroit. I had served what was equivalent to an apprenticeship in the machinist trade and considered myself a competent all-round mechanic. My new job was a fairly simple one, as lathe work goes, and consisted of taking a rough and finish cut off the outer surface of brass bushings used in the interior of valve cylinders. One by one I picked these bushings out of a pan on the floor beside my machine, machined them to a blueprint tolerance of a half a thousandth of an inch, and then dropped them into a second pan at the opposite end of the machine. It was close work and I found it mildly interesting. During the first month or two I devised a number of expedients to increase my output. There were intervals, for instance, during which I was delayed through having no material on which to work. By conferring with the foreman of another department the cause of these delays was discovered and a fairly uninterrupted flow of material to my machine assured. I obtained permission, also, to build a sort of chute over the lathe so that material flowed to me by gravity, thus saving the considerable total of time formerly spent in lifting material by hand from the floor to the machine. One or two other stunts saved additional time and increased output proportionately. I had been working in this manner for a few months when one morning the foreman of my department approached, accompanied by a stranger armed with a board having a stop watch mounted in its upper corner. This individual, the foreman informed me, was going to time study my operation very minutely. The study was authorized by the management and I was to answer fully all questions in respect to my work. The foreman then disappeared, whereupon the observer proceeded, in a diplomatic way, to interrogate me about my operation. My replies were noted down meticulously on an observation sheet. Next I was asked to start my lathe and to work at an average rate of speed, neither too slow nor too fast, while the observation was in progress. When about an hour had passed the observer informed me that he had secured all the data necessary for his purpose and that the observation was at an end. He then disappeared in the direction of the office. Presently things began to happen. First a millwright installed a different pulley on my overhead shaft so that the lathe would turn at a higher rate of speed. Next a tool-setter informed me that my cutting tool was not of the best shape and that, in line with instructions just received from the office, henceforth I must use a tool of another shape. Finally a typewritten instruction card prepared, ostensibly, in the office by the time study observer, was given to me for my future guidance. This instruction card showed the various stages in my operation with a corresponding time standard for each; it stipulated the speed of the lathe and the type of cutting tool I was to use; it described in detail all the necessary equipment, not forgetting my gravity chute; it informed me, finally, that if I worked diligently along the prescribed lines and completed my "task," as they now called it, within the time allowed, I would receive a bonus of something-or-other per cent over my regular earnings. There was an inference also that any future changes would be originated away off somewhere in a planning office, and I must now concern myself exclusively with following instructions as they came from this source. From my standpoint it was a little as if the substance of the job had suddenly vanished in thin air. I had become like one of the mannequins that we sometimes see crossing the vaudeville stage on invisible wires operated by someone in the wings. I worked along in a half-hearted way for a few weeks longer. I wasn't interested in the bonus, and I don't think I ever earned any. At length I threw up the job and soon afterwards obtained work in another shop where I received less money but regained much of the old freedom which I had had.

I offer this somewhat egotistical account only because of my later discovery that it parallels the