HUGH G. J. AITKEN

Scientific Management in Action

Taylorism at Watertown Arsenal, 1908-1915

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By

HUGH G. J. AITKEN

New foreword by

Merritt Roe Smith

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FOREWORD

The social history of technology has become quite fashionable in recent years, but it is not new. In fact, one of the best works in the field actually predates it by more than a decade. I refer, of course, to Hugh G. J. Aitken's masterful study of *Scientific Management in Action*.

Taylorism, the shorthand expression for Frederick W. Taylor's brand of scientific management, is one of the most frequently discussed topics in American business and technological history. General textbook writers often address the subject, and students of the Progressive Era invariably refer to it as an example of the reformist impulse to rationalize American society. In their efforts to make sense of Taylorism and place it in context, historians have brought a variety of interpretative perspectives to the study of scientific management. Some, like Frank B. Copley, Sudhir Kakar, and Daniel Nelson, approach the subject through the medium of biography and provide absorbing accounts of Taylor and his circle.[1] Others, like Samuel Haber, examine the movement through the prism of politics in order to reveal basic changes in the country's political structure at the turn of the twentieth century.[2] Still others view Taylorism as a critical juncture in the rise of modern industrial management and, depending on their point of view, depict the movement either as a force for more efficient business administration or as a frontal assault on the traditional prerogatives of labor.[3] Yet, as good as they are, none of these writers surpass Hugh Aitken in portraying the complex technical and human relationships that comprised scientific management.

When *Scientific Management in Action* first appeared in

1960 under the title *Taylorism at Watertown Arsenal*, it received an enthusiastic reception from reviewers. In his contribution to *The American Historical Review*, Alfred D. Chandler, Jr. hailed the volume as "the clearest picture yet written on the nature and significance of scientific management." Moreover, everyone who reviewed the book reached much the same conclusion. Writing in the *Business History Review*, George S. Gibb praised the book as "extremely competent" and "a classic in its field." John B. Rae agreed. "This book will be indispensable," he observed in the *Journal of Economic History*; "it can well be used as a model by those who believe that scholarly history can be written with literary charm." In fact, the only negative comment came from Gibb who mildly chided Aitken for being too cautious and restrained "in relating the Watertown episode to broad forces at work elsewhere" in American society. Gibb quickly added, however, that his remark "probably is not a criticism at all."[4]

Twenty-five years have elapsed since the book's publication, yet it remains as fresh today as it was in 1960. A question worth asking is why this is so. What accounts for the books's remarkable longevity and influence?

To my mind, three attributes—clarity, insight, and originality—distinguish the volume and give it special standing in the world of scholarship. There is no need to belabor the subject of clarity. As most readers immediately recognize, Aitken excels at describing the Taylor system and relating its component parts. But more than that, he reveals how various actors in the Watertown story—ordnance officers, arsenal workers, and Taylor associates—perceived the changes that were taking place and how they responded to them. The installation of Taylor's system at Watertown turns out to be a complicated saga fraught with misunderstanding, distrust, and conflict. Aitken succeeds in unraveling these complex social relations because he obviously understands the subject and writes with authority and feeling. By couching his study

within a well-defined community setting, he also is able to move back and forth between the general and specific aspects of the subject and to use one aspect as a means of illuminating the other. Each chapter thus provides a different angle of vision on scientific management. With each view comes an enhanced understanding of the system's complexity and importance.

Aitken's account is filled with revealing insights into the nature of scientific management. We learn, for example, that the primary goal of Taylorism was not merely to get employees to work harder but to control the entire job situation. We also learn that standardization became the primary means of achieving control. From the planned scheduling and routing of work in progress to the use of uniform belting and high-speed steel cutting tools, all of the innovations that together comprised scientific management were designed, as Aitken puts it, "to achieve total control of the job and its performance and in particular to enable management to prescribe and enforce a standard work pace" (pp. 28–29). Taylor's insistence that "no time studies should be attempted until all working conditions had been brought up to a high level of efficiency" reveals how vital uniform standards were to his system of management. Until Aitken clarified the nexus between standardization and control, few people fully appreciated this important aspect of scientific management.

An underlying premise of Taylorism, one that produced serious discord at Watertown, held that knowledge of every aspect of production was necessary for managerial control. "If Taylor was to attain his primary goal of securing complete control over the pace of work," Aitken writes, "it was essential that he know precisely the maximum rate of output of which his machines were capable" (p. 31). This meant that managers or their surrogates, the efficiency experts, had to enter the shop, observe workers at close range, and scrupulously record what they saw in an effort to acquire an under-

standing of individual production tasks. Doing so, of course, was touchy business, particularly when the observer entered the shop unannounced with a stop watch in his hand. In delineating the sources of conflict at Watertown, Aitken reveals, as no one had before, that knowledge was power and that workers sensed the threat time studies posed to their autonomy. Such studies were intolerable because they aimed at transferring the skills of the worker to the engineer. Faced with the loss of the one thing that insured their power on the shop floor, the molders at Watertown expressed themselves eloquently about their fear of dispossession. Aitken quotes one molder's statement that "I don't like a man to stand over me with a stop watch because it looks to me as if it is getting down to slavery." Others "felt hustled and driven and resented the idea of being set in competition with each other." It was "humiliating" and "un-American" (pp. 216, 150). When the molders walked out of the shop on August 11, 1911, Taylor knew that "a fundamental issue was at stake." "This strike hits at the very foundation of scientific management," he wrote to his colleague Carl Barth, "and if the owners of the company or the government are not to be allowed to obtain exact information, then scientific management becomes impossible" (p. 164). Taylor realized that technical knowledge was the basis of power and that "no limits could be placed on management's right to know" (p. 165). Thanks to Aitken's penetrating analysis, we now appreciate the full significance time studies had for labor-management relations under the Taylor system.

Other important insights enhance the book's reputation as a scholarly work. Aitken recognizes, for instance, that technology and management are inseparable and that one cannot study one without studying the other. Perhaps the most surprising insight is his discovery that time studies involved arbitrary, rule-of-thumb decisions that were not scientific at all. "The apparent accuracy and objectivity of stop-watch

time study," he concludes, "was therefore to a large extent an illusion . . . a ritual whose function it was to validate, by reference to the apparent objective authority of the clock, a subjective estimate of the time a job should take" (p. 26).

The subjectivity of this aspect of Taylorism becomes an important consideration in understanding the molders' reaction to being timed at their work. Indeed, Aitken points out that their distrust of the Taylor system stemmed largely from the fact that Dwight Merrick, the time-study expert at Watertown, knew little about foundry work and made arbitrary decisions about the length of time it should take for a molder to execute his work. This, coupled with the fact that Taylor and his military employers remained oblivious to the feelings and traditions of the Watertown work force, paved the way for confrontation. Not even the prospect of higher wages under Taylor's famous premium system could persuade the molders to acquiesce to the new regimen. If anything, it increased their suspicion "that they were being bribed or fooled into doing something that was not in their interest" (p. 211). Ultimately Taylorism failed at Watertown Arsenal because managers neglected to take into account the customs and feelings of those whom they sought to reform. Taylor and his disciples had mastered a number of important technical problems, but they remained blind to the inner workings of Watertown's social system.

What gives the book its special slant—its originality, if you will—is Aitken's attention to the arsenal's social and institutional processes. The topic of Taylorism was not new in 1960, but the way Aitken attacked the subject was. At that time books written about technological innovation tended to focus either on the internal development of new technologies or on their social impact. While Aitken does not ignore these aspects of the subject, the main thrust of his analysis aims at understanding the social tensions that arise when new technologies (including management techniques) are introduced

into the workplace. As indicated at the outset, this mode of interpretation would become well known during the 1970s as the "social history of technology."[5] Moreover, his effort to explain the unanticipated consequences of scientific management at Watertown provides an early example of retrospective technology assessment, an area of historical inquiry that is still maturing.[6] Clearly *Scientific Management in Action* is an innovative study, rich in wisdom as well as knowledge. Its evenhandedness in juxtaposing the positions of management and labor make it an exemplary scholarly work. After a quarter of a century it still remains the best study of the day to day aspects of scientific management in action. Princeton University Press is to be congratulated for making this landmark study available again.

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NOTES

1. Frank B. Copley, *Frederick Winslow Taylor* (2 vols., New York, 1923); Sudhir Kakar, *Frederick Taylor: A Study in Personality and Innovation* (Cambridge, Mass., 1970); Daniel Nelson, *Frederick W. Taylor and the Rise of Scientific Management* (Madison, Wis., 1980).

2. Samuel Haber, *Efficiency and Uplift: Scientific Management in the Progressive Era, 1890–1920* (Chicago, 1964). Also see Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890–1920* (Cambridge, Mass., 1959).

3. See, for example, Milton J. Nadworny, *Scientific Management and the Unions, 1900–1932* (Cambridge, Mass., 1955); David F. Noble, *American by Design: Science, Technology and the Rise of Corporate Capitalism* (New York, 1977), pp. 257–77; Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977), Chap. 8, esp. pp. 272–81; Daniel Nelson, *Managers and Workers: Origins of the New Factory System in the United States 1880–1920* (Madison, Wis., 1975), pp. 55–78.

4. See Chandler's review in *The American Historical Review* 60 (1960): 240–41; Gibb's review in *Business History Review* 34 (1960): 273–75; and Rae's review in *Journal of Economic History* 20 (1960): 456–57. Other pertinent reviews appear in *Technology and Culture* 2 (1961): 191–93; *The*

Library Journal 84 (Jan. 15, 1960): 270; and Eugene S. Ferguson, *Bibliography of the History of Technology* (Cambridge, Mass., 1968).

5. See, for example, George H. Daniels et al., "Symposium: The Historiography of American Technology," *Technology and Culture* 11 (1970): 1–35; and Anthony F. C. Wallace, *The Social Context of Innovation* (Princeton, 1982), pp. 3–4.

6. For overviews of retrospective technology assessment, see Howard Segal, "Assessing Retrospective Technology Assessment," *Technology in Society* 4 (1982): 231–46; and Stephen Cutcliffe, "Retrospective Technology Assessment," *STS Newsletter* (Lehigh University), 18 (June 1980): 7–12.

AUTHOR'S PREFACE

A generous endowment of natural resources, a culture that placed a high value on material success and individual initiative, a system of government that left economic power decentralized, a high rate of population growth and capital accumulation, and the ability to borrow and adapt techniques from more advanced countries — these are some of the factors conventionally regarded as having contributed significantly to the economic development of the United States and to the standard of living that we currently enjoy. Typically absent from such listings is any reference to business management. If mentioned at all, it is in connection with the deeds of conspicuous and often notorious businessmen — the robber barons, like Rockefeller, Morgan, or Harriman, or the captains of industry, like Carnegie and Ford. This is like writing the history of warfare in terms of generals and battles. Left out of consideration is the unspectacular work of organization, the day-to-day management of men, machines, and materials. It is strange that in the United States of all places the history of business management and the appraisal of its contribution to economic development should have been paid such scant respect.

The research for this book began while I was a member of the Research Center in Entrepreneurial History at Harvard University. Those of us fortunate enough to work in that group shared a common professional interest in the history of business as a social institution. We respected the work of the business historians, and we did not underestimate the value of the evidence that could be accumulated by the preparation of the histories of individual firms. But we

thought that there might be other approaches to the problem. The history of management is the history of ideas, of techniques, of innovations, and of traditions. Development in management is a social process that can be studied in the same way as development in art, in literature, or in science. How have concepts and objectives in business management changed over time? What have been the critical innovations, and how were they accomplished?

To some of my colleagues and to me it appeared that a promising line of attack would be to select a major innovation in business practice, to analyze its content, and to examine its impact upon the ways of doing business that were traditional and normal at the time of its introduction. The Taylor system of management seemed, by these criteria, to be a suitable subject. Here was an innovation that appeared to be clearly identifiable; it could be dated with adequate accuracy; and, to judge by the controversy it aroused, it marked a radical departure from what had gone before.

This book is a study of the Taylor system of management. I have tried to avoid duplicating work that has already been done on the subject. A formal biography of Frederick Taylor is readily available; I have, therefore, felt free to pass lightly over his life and personal activities. Two excellent studies of the reaction of organized labor to the Taylor system have recently been published by Professors Jean T. McKelvey and Milton Nadworny; this topic, accordingly, is dealt with only in outline, to the extent necessary for adequacy of explanation. Nor does this book contain a satisfactory account of the Taylor movement, although that too is a subject of the first importance, essential for an understanding of the origin of the profession of management consultant. What the book does contain is an analysis of the installation of the Taylor system in a particular manufacturing plant, and of the reactions to that installation.

The case method has certain advantages in historical

study: it makes possible an analysis-in-depth that is impossible in a general survey. Regarding Taylorism in particular, case studies are essential for an understanding of the relationship between theory and practice; it is dangerous to base an interpretation solely upon what the Taylor group and their opponents said or wrote about the system. But there are offsetting disadvantages to the case method: one is never quite sure what general significance is to be attached to the particular characteristics of the case chosen. The situation would be much improved if there existed a number of case studies of Taylorism in practice, to make possible systematic comparison. Unfortunately, parallel studies of this type do not yet exist. A few descriptions of plants organized along Taylorist lines are available, thanks to the early work of Hoxie, Babcock, Day, and others; but to the best of my knowledge this is the first empirical account of the introduction of Taylorism — of the process of change as well as the results.

The choice of Watertown Arsenal, a government-owned establishment, may give rise to criticism. The reason for the choice was simply that the source material was immensely richer than for any private firm. From some points of view a private establishment, such as the Bethlehem Iron Company, where Taylor also worked, might have been preferable. The evidence bearing on the Bethlehem case, however, is inadequate for the type of analysis attempted here. At the level of shop management and organization, which is what primarily concerns us here, it may well be doubted whether the fact of government ownership made much difference at Watertown. The institutional reaction to the innovation was admittedly different, because the workers at Watertown had means of protecting their interests not available to workers in private plants. The process of managerial reform, however, and the personal reactions of those involved may not have varied significantly. A workshop in a manufacturing

plant has its own structure and problems, no matter where the formal ownership lies.

There remains only the pleasant obligation of expressing my gratitude to those who have aided me in my work. To my former colleagues at the Research Center in Entrepreneurial History I owe a considerable debt — one of which I have become increasingly aware since leaving that hospitable institution. Professor Leland H. Jenks in particular has given me invaluable help and encouragement. For numerous constructive suggestions I am indebted to the friends and associates who were good enough to read the manuscript before publication, and in particular Professor John T. Dunlop of Harvard University and my colleagues at Riverside, Professor Emeritus Gordon S. Watkins and Professor Charles Woodhouse. The librarian of the Taylor Collection at Stevens Institute of Technology provided invaluable assistance, as did the staff of the Army Section, War Records Division, National Archives. Mr. John P. Frey, president emeritus of the metal trades department, A.F.L.-C.I.O., and Mr. Carl Huhndorff, Director of Research, International Association of Machinists, furnished information otherwise unobtainable which must be acknowledged with gratitude. Lastly, and in a more personal sense, I would acknowledge the unfailing encouragement and assistance of my wife, who not only bore the major responsibility for the physical preparation of the manuscript but also, in less obvious ways, made the completion of the work possible. Responsibility for errors of omission or commission, needless to say, must rest solely with the author.

H.G.J.A.

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SCIENTIFIC MANAGEMENT IN ACTION

INTRODUCTION

On the morning of February 17, 1915, four men met in an office in Watertown Arsenal, on the left bank of the Charles River, a few miles west of Boston. One of the men was the commanding officer of the arsenal, Colonel C. B. Wheeler, a career Army officer. The other three were civilians: Robert G. Valentine, once instructor in English at Massachusetts Institute of Technology and more recently Commissioner of Indian Affairs and chairman of the Massachusetts Minimum Wage Board, at this time a management consultant in private practice; John P. Frey, vice-president of the International Molders' Union and editor of the *International Molders' Journal;* and Robert F. Hoxie, a brilliant man whose life was shortly to end in suicide, professor of political economy at the University of Chicago.

Probably only Hoxie had much enthusiasm for the assignment that brought them together. Appointed some eighteen months earlier to the staff of the United States Commission on Industrial Relations, he had been assigned the task of investigating the effect on the working man of certain innovations in methods of industrial management, popularly known as Taylorism or "scientific management," which had recently attracted public attention. Some of the work he had already completed: firms using these methods had been identified; lengthy questionnaires had been circulated; and the views of businessmen, management experts, and representatives of organized labor had been conscientiously canvassed. Now, as the final step in his investigation, Hoxie was visiting some of the industrial establishments in which the new methods had been introduced. Watertown Arsenal, for

a number of reasons, was high on the list. Valentine and Frey accompanied him in the capacity of "experts," selected by a group of leading management consultants and by the Executive Council of the American Federation of Labor, respectively, to insure the fairness and accuracy of the inquiry. Frey had accepted the job reluctantly, as a public duty he could not shirk. Valentine had been nominated after several of the better-known consultants had declined to serve.

The interview began with Valentine doing most of the questioning.[1] Wheeler was well prepared, with the necessary facts and statistics at his finger tips. He had, after all, been responsible for the managerial reforms at the arsenal ever since they had been first instituted in 1909, and in the intervening years had had to defend them on more than one occasion and before critical audiences. The round numbers in which he described the effect of the innovations were mentioned as if they must surely be familiar already to his listeners. "The increase in output has been one hundred and fifty per cent. We are doing work two and one-half times as fast." Some of the more important changes — the routing of parts and components, incentive payments, time study, and the standardization of equipment — were described and the total effect on production costs estimated as closely as honesty and available information permitted. "The savings in labor cost would be about one-half the labor cost under the day wage system, while the increase in overhead expenses . . . would probably not exceed twenty per cent. . . . We figure that we save in machine work, for every man on premium, approximately $9.00 per day." As an item of incidental interest, Wheeler mentioned that they had recently provided work seats for many of the machinists, for they were confident that under the new system of management there could be no "soldiering" — the popular term at

that time for a work pace slower than was thought proper by management.

It was a quiet, factual, unemotional presentation, and the stenographer in the corner of the room might have been pardoned an occasional yawn. Nothing particularly novel or exciting was being said. It was all on the record already—briefly in testimony before the Interstate Commerce Commission,[2] when counsel Louis Brandeis had called witnesses to prove that the Eastern railroads were not being run as efficiently as modern knowledge allowed; at greater length before a congressional committee investigating scientific management;[3] and in infinite detail in the files of the Ordnance Department, in the many progress reports which Wheeler had submitted to his superiors. It was not even particularly controversial any more, for the public press had wearied of "scientific management" and the unions' attacks seemed for the time being to have petered out.[4] Scientific management at Watertown Arsenal was, in February 1915, an established fact. It was now the norm, and an innovation no longer. The days of conflict were, it seemed, past.

As the talk became less formal, Wheeler and the others began to reminisce. For Wheeler and Frey in particular this opportunity for an exchange of information must have been intriguing. A little over three years before they had met under very different circumstances. When Frey had called to see Wheeler in the late summer of 1911, the gates of the arsenal had been patrolled by soldiers with fixed bayonets, and their interview had been much less amicable.[5]

The reason for their meeting on that occasion had been to negotiate a settlement of a strike. The molders employed in Watertown Arsenal foundry had quit work, almost without warning, as a protest against the introduction of time study. As strikes go, it was a very small one, for the men were back at work in a week. But it had become something of a *cause*

célèbre; it had precipitated a major political drive against scientific management by the unions; and it had been a serious embarrassment to the Ordnance Department. None of those involved had forgotten it. None of them, even three years later, felt that he understood it.

The topic of the strike arose in the course of the discussion, in connection with the reactions of the employees to the time studies that had been made of their jobs. Wheeler insisted that the workmen at the arsenal had, in the beginning, made no protest against the use of the stop watch. He had had only two individual complaints on that score since the system was instituted, both of them from the same man, a machinist who had been employed at the arsenal for fifteen years, and the matter had been adjusted amicably. The hostility that later arose was due, he implied, to outside influences that had been brought to bear on the men. The fact that the men themselves did not object to time study until union agitation induced them to do so was demonstrated, he argued, by the absence of complaints during the first few months.

Wheeler was repeating what had always been his conviction: that the labor troubles that had afflicted the arsenal since the introduction of scientific management were inspired and instigated by the unions and did not arise from any real dissatisfaction on the part of the men themselves. His statement that he had received only two individual complaints was carefully phrased: the emphasis was on the word "individual." Pressed by Valentine on the point, Wheeler was compelled to qualify his assertion. What he had said was true for the machine shop, where most of the time studies had been made. In that department time studies had been instituted in May 1911, and no complaints had been received from the men until more than six months later, when union agitation against stop-watch time study was becoming extreme. The foundry was a different matter. There trouble had

started as soon as the stop watch made its appearance, in the early part of August. The first time study had been made on a certain molder doing a bench job. The man had not complained, and Wheeler and his subordinates had had no idea that there was any objection. The next morning, however, when an attempt was made to time another molder on another job, the man refused. Before Wheeler even learned what was going on, the molders had quit work in a body. Apparently they had held a meeting after work the night before, at which they had decided not to allow any more time studies to be made, and they had prepared a petition on the subject to be handed to Wheeler. But Wheeler failed to see the petition until after the strike had begun. It was a most unfortunate incident, but not really very important. "I think they remained out on strike about ten days, and came back to work again and we continued to make time studies from that time on. . . . We started out just as if they were returning from an ordinary vacation."

Wheeler's plain implication that all the labor troubles which the arsenal had experienced since the introduction of scientific management were due to the irresponsible intervention of the unions was not something that Frey, a union man, could quietly accept. Frey, too, knew something about the molders' strike, and what he knew did not coincide with the impression that Wheeler's remarks had left. Furthermore, there were certain questions about the strike which had never been properly answered, in Frey's opinion. He put a question to Wheeler directly: "I wonder how it is that the men did not get to you before they took any final action in the matter of the strike?"

Here was a weak point in Wheeler's explanation. As commanding officer it was his responsibility to know what was going on in the various departments. Yet this was an instance in which he had clearly been caught unprepared — necessary information had reached him too late. Either of two explana-

tions would fit the facts as Wheeler knew them: the strike might have been spontaneous, an action taken by the men almost on the spur of the moment, without external influence, or it might have been, as he believed, an action taken under instructions from the union, something to be done immediately a certain action was taken by management. Why was he so convinced that the second explanation was the correct one? If it was correct, why had he had no forewarning?

There was only one answer Wheeler could give to Frey's question: "I never found out. As I understand it, they handed the officer in charge the envelope addressed to me, but before it came to me, they went out. I immediately went out to the foundry. When I arrived there, the men had their coats on and were leaving." But was this not inconsistent with his belief that the men were acting under instructions from the union? Did it not suggest rather an unrehearsed, spontaneous action? Not at all, as Wheeler saw it: "To my mind it was premeditated; it was part of a program. They were all pleasant enough that morning. I asked one of the men why he was going out and he said they were ordered to go out. That is all I know about it."

Wheeler's view had, in the years since August 1911, become the official Ordnance Department explanation. It was an explanation which absolved the department of all responsibility. The department had not been maltreating its civilian employees. The fact that a group of skilled men, none of whom had been employed at the arsenal for less than five years, had chosen to quit their jobs rather than work under the new system of management was no reflection on the ability or good intentions of the department. It reflected the irresponsibility and the power of the craft unions.

If plausibility and internal consistency were the only tests, Wheeler's theory might have had much to recommend it. Frey knew, however, that it was wrong, at least in part. The International Molders' Union had no authority whatsoever to

order a strike. Its power was limited to giving official sanction to a strike. Furthermore, the giving of official sanction, and the strike benefits that accompanied it, was contingent upon the local union having gone through a prescribed constitutional procedure, involving negotiations with the employer and reports to the Executive Board. This procedure had been completely ignored by the Watertown Arsenal workers. They had gone on strike without even informing their local, far less the International, of what they intended, and the Executive Board of the International had been reduced to giving official sanction to their action after the event. And yet here was Wheeler asserting that the union had ordered the strike. This Frey knew to be incorrect.

To set the record straight, however, it was necessary for Frey to explain how the strike really had occurred, and this he found by no means easy. He wanted to say that the men had gone on strike as a protest against scientific management. But if this were the case, there must have been considerable resentment against the new methods among the arsenal employees. How, then, to explain the fact that the union officials had been as much surprised by the strike as the commanding officer? They had been aware that scientific management was being installed at Watertown; they had publicly berated the new system as being oppressive to the working man; and they had even prophesied that the Ordnance Department would have trouble with its employees if it continued on its course. Had there perhaps been a breakdown of communication between union officials and employees as great as that between employees and plant executives? The explanation Frey wanted to give involved awkward admissions regarding the relations between the unions and their members.

Apart from giving a lengthy exposition of the correct procedure by which a member of the International could officially go on strike, Frey found himself at a loss as to how to correct Wheeler's blunt statements. Valentine put his

finger on the crux of the matter: "Apparently no attempt at thrashing this thing out was engaged in before this strike was called?" Frey replied that such was apparently the case. Was this customary? No, it was not customary. It was customary to do everything possible to settle the dispute. In this case, of course, Frey suggested, it being a government plant, and the government having decided to do one thing, and the men having decided that they did not want to do it . . .

But Wheeler would not let this suggestion pass. The men were actually better protected in a government establishment, he pointed out, than they would be in a private firm. They could appeal not only to the officers of the arsenal where they worked, but all the way up to the Chief of Ordnance or the Secretary of War, or they could write to their Congressman or Senator, who could take it up with the President if he wanted to.[6] An employee in a government arsenal was, after all, in a certain sense part owner of the place where he worked. He had means of bringing pressure to bear on management which were not available to an employee of a private establishment.

But if there were all these channels for complaint, why had the men not used them? Well, there was a lot of red tape involved, suggested Frey. Then again, the situation was a novel one. If it had been a matter of a wage reduction, for example, the men would presumably have acted in a more predictable fashion. But time studies were something new and strange, and perhaps they had felt that they had to take a stand immediately or not at all.

Frey and Wheeler were both theorizing. Neither could give a satisfactory explanation of why the strike had occurred. In itself this was of no importance. The strike was long over. Since then the conflict between the Taylor system and the unions had shifted to a different battleground and was being decided by different tactics. Yet it is clear that