

EMPLOYER CONTROL AND
HIERARCHICAL COMMUNICATION IN THE WORKPLACE:
A HISTORICAL VIEW

by

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Employer control and hierarchical communication in the work place:

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ABSTRACT

EMPLOYER CONTROL AND HIERARCHICAL COMMUNICATION

IN THE WORKPLACE: A HISTORICAL VIEW

This thesis is concerned with discovering the way that the particular needs of employers as employer in a profit-motivated economic system have historically influenced the organization of work and workers inside the plant or office, at the actual point of production, in large workplaces in western industrial society. The organization of work is one of the basic structures of everyday life, and as such constitutes an important communication network in addition to its more immediate economic purpose.

The approach taken is historical, using information taken for the most part from secondary sources, and the methodology is essentially historical materialist, looking at the results of the dynamic conflict between the interests of employers and employees. The assumption is made that the most light will be shed on the development of the modern western organization of work during periods of industrial upheaval in the most developed economies, or the most rapidly developing ones, and the intensified competition that is associated with those periods. Attention is focused on the Industrial Revolution in England and the turn of the century in the United States.

The organization of work is seen as being composed of two elements: the division of labour and technology. The relationship between the two elements is seen to be one of mutual interdependence. Technology is not viewed as a determining factor in the development of the modern organization

of work. The impact of the social, economic and entrepreneurial priorities of employers on the development of the two interdependent elements of the organization of work is analyzed in the two periods of rapid economic growth referred to above. In both periods, major and expanding industries are taken as the primary example. The impact of movements and initiatives of workers during those periods is also taken into account.

Data is presented to support the view that during the Industrial Revolution, the need of employers to control and make predictable the behaviour of workers on the job was in part responsible for the appearance and extension of the centralized workplace and the elaboration of an employer-enunciated and enforced discipline in the workplace. Then it is found that the intensification of the division of labour, accomplished through the decomposition and recombination of the processes of production, as well as accelerated innovation and application of machinery, was part of the employers' strategy to expand their control over workers and the production process in response to the actions of workers tending to limit the operational freedom of employers.

The expansion of employer control continued during the period of rapid growth in the United States in the early years of this century. The analysis, with supporting data, of this period's developments in the industrial organization of work, identifies the destruction of a limited form of workers' control inside the workplace, based on the possession of craft knowledge, skill and tradition, and its replacement with a new hierarchy expressing employer control as being a significant foundation for the present organization of work in the industrialized West.

The developments in the organization of work that took place during those two periods in response to the conflict between the interests of employers and employees constituted the basis of the modern organization of work in the western industrial world, and established the basic structure of the workplace communication system.

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CHAPTER ONE

INTRODUCTION

Communication is the exchange of information. It does not take place in a vacuum. When we are talking about human communication, we are immediately referring to a social organization of information exchange. The way that it happens is not accidental; it is structured by and can only be understood by reference to the distribution of power in its social environment. This is as true of small group interactions as it is of mass communication. And it is as true of social institutions which don't have information exchange as their primary purpose as it is of those which do.

The last point is important because all components of social organization are communicational in the broadest sense: that is, they involve the exchange of information. Smythe is quite clear on this:

The social habits known as institutions are systematic relationships of people. They have specialized agendas for their own actions (the family for the nurture of children, "work" organizations with "production" activities, ...etc.) but they also embody in their actions and incidentally propagate the ideological theory and practice of the whole social system. Dependent on the application of mass production techniques, the specialized institutions for mass communications were late arrivals (printing since the 16th and electronic since only the 19th). While other institutions have as incidental to their specialized functions the general function of legitimizing and directing the development of the social system, the communications institutions have this as their specialized function.¹

Smythe is here primarily concerned with advancing a way to interpret the role of what he refers to as communications institutions. In doing so, he recognizes that other parts of organized social reality also

have communicational significance.

We can study the meaning and significance of communication whether it be located in the structure and content of mass communication, or in the structure and content of interpersonal communication. We can also study the meaning and significance of the secondary communication functions of institutions such as the family organization which have other primary functions. The structures of daily life are also communication networks, in addition to their other and primary functions.

Smythe has used the concept of "setting the agenda" as a way to view the specific role of the communications institutions:

The function of the mass media in the monopoly capitalist context...is to set the agenda which best serves the interests of the capitalist system.²

He has said that other social institutions, in addition to having their particular specialized functions and agendas, also have secondary functions similar to those of the specialized communications institutions. It follows to complete this line of reasoning that all modes of communication, whether they be specifically for that purpose or otherwise, have an agenda setting role. They focus attention on what is to be recognized as a topic of discussion and action. As well, they establish what is to be presumed as a given or what is to be taken as a foregone conclusion. They are sometimes said to be ideological to the extent that they operate to maintain, create or justify the exercise of power by one social group over another. They can do that directly or indirectly.

Work is one of the primary activities in which most people engage for a large part of their daily life, and which forms the day to day

conditions of their existence. It is one of the most basic of the social arrangements for living. It plays an agenda setting role by focussing attention on the assumptions about "human nature" and the economic system which are implicit in the way it is organized. Work, in addition to being productive activity, is also a communication institution.

But work is not simply productive activity in the abstract. The organization of work is the way that a society arranges its people and its resources to produce its goods and services. In any kind of society, it is an expression of the way that economic activity is carried on. In a capitalist economy, work is organized according to the necessities of profit efficiency. It is characterized by certain patterns of interaction in which messages circulate that tend to reinforce the capitalist logic of how and why people work. An examination of the capitalist organization of work will reveal how one of the most basic of the social arrangements of living has been arranged to "incidentally propagate the ideological theory and practice of the whole system." The capitalist organization of work is a production centre for the formation and maintenance of a particular sort of "human nature" through the systematic human relationships that it involves. Those relationships are predicated on a certain type of human nature which they call into being and reinforce.

The modern industrial organization of work and its communicational aspect characterized by certain rules and patterns of interaction is not simply an immutable practically rational and technically efficient formation. It was and is shaped under the influence of the disharmony of interest between capital and labour. The present organiz-

ation of work reflects the conflict between the historical interest of capital in structuring it so that as little as possible is left to the voluntary discretion of labour, and the historical interest of labour in the opposite.

In contemporary experience, the workplace message system (with some exceptions such as some member-run co-operatives) is a hierarchical one and has been for quite a long time. Over the last two hundred years the specific features of the workplace as an expression of the organization of work have undergone many significant alterations, but always hierarchy in one form or another has remained. That hierarchy in its present form can be traced to the necessity of control which comes from the relations of capitalist production. Capital buys labour power, or the capacity to do work. That capacity is bought by the hour, by the week or by the month. But it is not a fixed quantity. Rather, it depends on a number of factors, such as the training and experience of the worker and the quality of the tools or equipment available for the worker to use. Not the least of these factors is the subjective attitude of the worker with whom remains the choice about how much diligence, care and effort to use. This subjectivity can greatly affect the profitability of the purchase of labour power to the employer, who therefore becomes concerned that the subjectivity of hired labour power embodied in the worker be made to conform to his own advantage.

In a capitalist economy we are dealing with a job situation which can generally be characterized by saying that employees can be expected to experience the requirements of the employer as alien outside

demands. They are subordinating themselves to an alien outside will by selling their time, and would not necessarily of their own accord fulfill the goal of capital accumulation and profit for someone else. Some sort of social control must be generated to ensure that employees will participate to the maximum extent possible in the creation of profit.

There are many facets of the social system which act in concert to effect this, and they should not be discounted. However, we are here concerned with the power that ownership of the productive apparatus confers on capital to construct the organization of work itself so that it contains arrangements for social control ensuring the maximum benefit to capital of the purchase of labour power. This thesis will examine the way that this power has historically manifested itself in structuring the organization of work. It will be argued that work has been organized to incorporate the necessity of controlling workers' activities so that they will be maximally profitable, independent of whether the workers themselves so desire.

The terms "organization of work" and "labour process" are used interchangeably here. They refer to the way in which the various steps involved in producing a good or service are arranged and accomplished, including the division of labour, the method of matching workers to the parts of the productive process as it has been divided, the method of coordinating the efforts of all those involved, and the kinds of tools and technical methods utilized.

The approach taken will be primarily historical, in this case historical interpretation based for the most part on secondary sources and also on some texts originating from the periods under consideration. Original historical research in the subject of this thesis would have

required extensive travel and a significantly longer period of time to undertake. The use of secondary sources in a work of historical interpretation, however, does give rise to certain problems. It means that the work is based on accounts of historical facts which are in themselves works of interpretation, relying on the selection and judgements of their authors. Although the problem is unavoidable in the use of mainly secondary sources, adverse effects may be reduced by making use of a number of different sources. The presumption here is that the bias contained in an individual work of historical interpretation based on primary sources may be partially compensated for by the addition of and comparison with works by other authors. The present work has been done with an effort not to depend heavily upon any one secondary source, but instead has made use of works by a number of authors who are not always in agreement.

Without making any claims for the further elaboration of historical materialism as a theory, this work uses a historical materialist approach. A historical materialist approach begins with the assumption that in order to understand the present we have to understand the past, that social conditions must be understood in the context of their development. It attempts to explain economic and social formations by rooting current analyses in a more general understanding of the material conditions and by viewing history as itself the product of the relations and activities of men and women. Thus historical materialism demands that any given pattern of social or economic change or development be understood through a concrete empirical observation that is based in a search for explanation in the material conditions of life and in the broad social relations developed in conjunction with the economic arrangements of a society for the provision of the goods and services that sustain particular patterns of life and activity

in that social context. This thesis sees the dynamic conflict between the interests of employers, taken as a group, and employees, also taken as a group, as the primary motivation for specific changes and developments in the organization of work at the point of production. While recognizing that there is a school of thought in classical sociology, first elaborated by Weber, that would seek to explain the modern organization of work as an example of the general tendency for a burueaucratic form to develop over a period of time in any kind of social organization that has outgrown a personalistic method of control, the analysis that is being put forward here attempts to explain the historical development of one of the structures of everyday life through the specific conflict between one broad economic group, or class, and another.

The approach taken by this thesis is similar to that of Harry Braverman in his ground-breaking work, Labor and Monopoly Capital, in which he identifies the logic of the changing organization of work in this century as being a continuous one of ever greater recreation in the interests of management. Braverman, however, is largely concerned with showing how the process of the degradation of work, as he called it, has changed the composition of the working class. The present work takes a somewhat different approach in that the emphasis remains on the shopfloor itself, and in that it presents a more detailed analysis of the early beginnings of the modern organization of work just prior to and during the Industrial Revolution. In addition, whereas Braverman tends to present his analysis as the story of the initiatives taken by management in their own interest, this work attempts to take more account of the role played by the other half of the equation: the workers, their initiatives, their organizations, traditional and otherwise, and incipient workers'

control movements. It is hoped that the present work will read as more of an analysis of the modern organization of work as stemming from the conflict between two opposing groups and of the contributions of both parties to that conflict, than as an analysis of the actions of one group taken against the other.

There were two major phases in the development of the modern organization of work: the Industrial Revolution and the early years of the twentieth century. During both periods there were important developments in the organization of work. In both periods those changes were associated with firms that represented the most dynamic sectors and tendencies in the economy.

It was during the Industrial Revolution that capitalism began to assert its influence over the organization of work. Prior to this time, incipient capitalism as the ascendent mode of economic activity already had a kind of formal control over work to the extent that labour had already been commoditized and to the extent that the merchant capitalist was the dominant integrative force in controlling production for the market. But until the Industrial Revolution began, capital did not exert direct control over the labour process. It had simply used and modified the pre-industrial organization of work that it inherited from earlier days. With the advent of the Industrial Revolution, capital began to restructure the labour process dramatically according to its own needs. The most significant results were the appearance of a centralized work location in which employees were subject to the strict discipline of their employers, and the appearance of a minute division of labour with workers assigned to specific detail tasks. The analysis in this work is based on the Industrial Revolution as it took place in England.

The second significant period in the development of the modern organization of work was around the beginning of this century, from roughly 1885-1920. This time the United States rather than England was in the forefront of events. The United States entered this period as a predominantly rural agrarian society and emerged as the world's leading industrial power. It was a time of intense business competition which led to the formation of huge industrial combinations in oil, steel and chemicals as well as other sectors of the economy. The giant firms marginalized, eliminated or absorbed many of the smaller firms of the day, replacing small time competition with monopoly capitalism as the most outstanding characteristic of the economy. In this climate of intense competition, sloppy management often meant annihilation. One of the ways that the competition for business survival expressed itself was in the surge of managerial interest in finding ways of squeezing more out of their workers. There were renewed efforts to take more direct control of production through a more complete separation of mental from manual labour and a systematic application of the detail division of labour. That period saw the appearance of more sophisticated strategies for increasing worker productivity that involved techniques that added new features to the organization of work such as the manipulation of wage systems and internal labour markets (job ladders and internal hiring and promotion schemes). Every restriction on the freedom of employers to operate their businesses as they wished, including both unions and the traditional restrictions on the organization of work stemming from a limited form of workers' control, were crucial and could have meant the difference between survival and bankruptcy. Employers mounted an energetic assault

on both. This period in the United States saw the emergence of a managerial reorganization of work which attracted international attention and imitation. The essential elements of that reorganization survive to this day and constitute the foundation of the modern labour process.

It will be seen that knowledge of the process of production gave power to those who possessed it and had the ability to make use of it. Much of what was being fought over, especially during the Progressive Era, was the possession of knowledge on the job, and the power that possession of such knowledge conferred on the possessor.

For a large number of theorists both within the discipline of communication and outside it the organization of work is not a topic, much less an issue. Within the field of communication this is perhaps explained by the fact that the area of study has not yet concluded the process of defining for itself the scope of its domain. It has generally concentrated on those areas which might be classified as having communication as their primary purposes such as the media on one hand and personal interactions on the other. This thesis is taking the position through its choice of topic that the study of communication should be broad enough to include a recognition and analysis of the communicational significance of the structures of everyday life, such as the organization of work. Their characteristics as a communication network are determined by the social and economic influences that have defined their primary purposes. This thesis is an examination of some of the social and economic influences that have combined to define the structure of the modern organization of work.

Chapter Two describes the modern organization of work and

examines some of the ways that workers perceive it and react to it. Chapter Three discusses the two components of the organization of work, the division of labour and technology, and their relationship to each other. Chapter Four traces the appearance of some of the most important aspects of the modern organization of work that originated during the Industrial Revolution in England. Chapter Five is concerned with the development during the Progressive Era in the United States of much of what can be seen as the fundamental features of the modern industrial capitalist organization of work. Chapter Six contains the conclusion.

It should be pointed out at the outset that this thesis does not attempt to provide an extensive analysis of large scale market developments in the economy, although such developments are of course the background to the scenario under consideration. General expansion of national and international markets of course has an impact on the scale of economic operations and on the growth in size of workplaces and number of workers employed therein. That is taken as a given in the present work. In any event, the sheer growth in quantitative size of markets, factories and the entire scale of economic activities does not in itself explain the quantitative changes that created the modern industrial organization of work.

FOOTNOTES TO CHAPTER ONE

1. Dallas W. Smythe, "The Role of the Mass Media and Popular Culture in Defining Development," Paper presented to the International Scientific Conference of Mass Communication and Social Consciousness in a Changing World, Leipzig, 17-20 September 1974, p. 1-2.
2. Smythe, p. 9.

CHAPTER TWO

DISSATISFACTION WITH WORK

The last decade witnessed an upsurge of academic and managerial interest in what might generally be termed alienation in the workplace. Increasing notice was taken of indications of disenchantment with the way that modern management deals with its labour force, especially among younger workers. Business and management magazines began to feature articles on the alienated worker. A great number of studies were published on the extent of alienation and dissatisfaction among workers, both white and blue collar. North America began to hear about the experiments in work organization in Swedish industry.

This chapter summarizes the findings of some of those studies done about the extent of dissatisfaction with work among employees. The outstanding characteristics of work in the modern industrial world are explored in an effort to understand what has prompted the dissatisfaction that has been so much taken note of in the past decade.

Before any sense can be made of the idea of dissatisfaction with work, we must know what we mean by satisfaction with work. Any conception of what constitutes satisfying work must depend on prevailing social attitudes about the meaning of work itself. The meaning of

work and the social expectations surrounding it are quite different from what they were even two hundred years ago.

Consider what Blake, who was a trained craftsman, wrote about the experience of work during the Industrial Revolution:

Then left the sons of Urizen the plow and harrow, the loom,
 The hammer and the chisel and the rule and compasses...
 And all the arts of life they chang'g into the arts of death.
 The hour glass contemn'd because its simple workmanship
 Was as the workmanship of the plowman and the water wheel
 That raises water into Cisterns, broken and burn'd in fire
 Because its workmanship was like the workmanship of the shepards
 And in their stead intricate wheels invented, Wheel without wheel,
 To perplex youth in their outgoings and to bind to labours
 Of day and night the myriads of Eternity, that they might file
 And polish brass and iron hour after hour, laborious workmanship,
 Kept ignorant of the use that they might spend the days of wisdom
 In sorrowful drudgery to obtain a scanty pittance of bread,
 In ignorance to view a small portion and think that All,
 And call it demonstration, blind to all the simple rules of life.¹

And the contemporary comments of a steelworker:

My attitude is that I don't get excited about my job. I do my work but I don't say whoopee-doo. The day I get excited about my job is the day I go to a head shrinker...

Why is it that the communists always say they're for the workingman, and as soon as they set up a country, you got guys singing to tractors? They're singing about how they love the factory. That's where I couldn't buy communism. It's the intellectual's utopia, not mine. I cannot picture myself singing to a tractor, I just can't. (Laughs) Or singing to steel. (Singsongs.) Oh whoop-dee-doo, I'm at the bonderizer, oh how I love this heavy steel. No thanks. Never happen.²

Between the lament and the apathy lies a vast gulf. In the first, the recasting of work is bemoaned. In the second, there is no sense of bereavement; quite the contrary, it has been accepted as

self-evident to any reasonable person that work is nothing to feel any kind of concern about or commitment to. They are connected only by the nearly two hundred years of industrial society that stretch between them, and which make possible the calculation of a trade-off.

The logic of the trade-off goes something like the following: life and work were miserable during the birth of industrial society (though arguably no more miserable than in earlier times). For this there are a variety of reasons: it was a period of upheaval; of primitive accumulation; of moral uncertainty. Whatever the reasons, work has become less brutal perhaps, and certainly of shorter duration since the power to deliver the unprecedented affluence of our age has steadily grown. The hours of work in everyone's life are the price we pay for the affluence. Therefore, the more efficient are the hours of work, the better because that means fewer hours. The cost of efficiency may be that work is of such a character that most of us want to get through it as fast as possible in order to enjoy the affluence at the end of the day or week. As this state of affairs is probably unavoidable, though unfortunate, it is not worth further consideration. Understanding this train of thought makes it comprehensible that a steelworker would think that only a pathetic pest would expect him to be committed to his work.

Indications of Dissatisfaction

In the majority (if not most) of job situations whether in private industry or government or service operations, people find themselves placed somewhere in a pyramidal shaped stratification of responsibility, power, authority, skill, status and salary. Within

this structure is an elaborate system of supervision in which areas of responsibility are sharply divided so that one finds the increments of responsibility gradually increasing as one reaches the top where the overall integrating authority resides. In this structure many people find that they are reduced to repetitively performing a series of tasks over which they have little or no control. Control of most work processes does not rest with those who perform them. This is true not only of manual jobs, but also of a large number of white-collar jobs. A report released by the U.S. Secretary of Health, Education, and Welfare in 1973 states,

The office today, where work is segmented and authoritarian, is often a factory. For a growing number jobs, there is little to distinguish them but the color of the worker's collar: computer keypunch operations and typing pools share much in common with the automobile industry.³

It appears that a rising though frequently passive and individualized resistance to meaningless and dissatisfying jobs is taking root. In 1970, Fortune magazine surveyed corporate leaders from the Fortune 500 (the 500 largest corporations). They were asked, "Do you feel that hourly paid workers in your company are more conscientious about their work than they were a generation ago, less conscientious, or just about the same?" A substantial sixty three percent felt that their workers were less conscientious. This response was fairly evenly distributed through all sectors of industry, but notably the largest industrialists (sixty eight percent) were more often convinced that their workers were less conscientious. These executives were then asked in what ways their workers were less conscientious. The single answer they most often gave

was worker slowness and laziness (thirty six percent). Lack of interest, pride, dedication, responsibility or loyalty to the company together were mentioned by seventy one percent of the executives. Other reasons were an unspecified unhealthy change in philosophy (eleven percent) and more coffee breaks and not working a full day (nine percent). Least cited reasons were worker identification with the union instead of the company (four percent) and the need for more supervision (three percent). (More than one response was permitted.) It is clear that these executives felt there was something wrong with their workers' attitudes towards work.⁴

Aside from the opinion of management, there are other indications of something amiss in the world of work. High turnover rates (as high as thirty percent annually in some white-collar operations⁵), industrial sabotage, and lack of pride in the quality of work performed are widespread and on the rise. Absenteeism doubled at Ford and General Motors in the ten years between 1960 and 1970. It became difficult to get the assembly lines moving quickly after shift changes due to a high level of tardiness. There were more complaints about quality, more complaints about discipline and overtime, and more grievances. Turnover rates were up to 25.2 percent at Ford in 1969. "Some assembly-line workers are so turned off, managers report with astonishment, that they just walk away in mid-shift and don't even come back to get their pay for the time they have worked."⁶ By September of 1976, between three percent and seven

percent of the total US workforce was AWOL on any given workday. A spokesman for a large farm equipment maker, Deere and Co., has said that they could lay off eight percent of their employees if everybody they hired would come to work. Recent estimates place the cost of absenteeism to the Canadian economy between \$4 billion and \$5 billion annually - then times the cost of labour disputes.⁷ Some industries are more hard hit by absenteeism than others. In general, low-skill, low-paying jobs show the highest rates of absenteeism. It might have been expected that the recession and high unemployment rates would have the effect of lowering absenteeism. This has not happened. In fact US figures in the mid-seventies are slightly higher than they were in the more prosperous sixties.⁸ (See Table 1).

TABLE 1
ABSENTEEISM IN THE U.S., 1967-1975

Year	Full-week absences per 100 workers in an average week	Part-week absences per 100 workers in an average week
1967	2.2	3.9
1978	2.3	4.1
1969	2.4	4.1
1970	2.5	4.2
1971	2.4	4.3
1972	2.3	4.3
1973	2.3	4.4
1974	2.4	4.2
1975	2.6	4.1

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics 1976, (Washington, D.C.: U.S. Government Printing Office, 1976), p. 301-8.

NOTE: Excludes domestic and agricultural workers.

Another not quite so passive indication of resistance is the proportion of work stoppages which are due to issues related to plant administration. Plant administration includes such matters as physical facilities and surroundings, supervision, shift work, work assignment, work load, work rules, overtime work and discipline as well as safety. Both the percent and absolute number of work stoppages in the US related to conflicts over plant administration (as well as the total days lost for all work stoppages) went up in the years between 1967 and 1974 (the last year for which figures could be found). Within the area of plant administration, more work stoppages are related to disciplinary issues than to any other single issue.⁹

The above figures would seem to indicate some kind of negative attitude toward work. However, it is very difficult to measure job discontent. A staggering number of studies have been produced concerning how to measure dissatisfaction with work. An even more staggering number have been written giving the results yielded by the use of various methods.¹⁰ It is well to keep in mind that a good percentage of these works have been oriented towards the management view. The opening words to one, entitled Where Have All the Robots Gone, provide an enlightening illustration: "Suddenly, in the seventies, we are becoming curious once again about vast numbers of our fellow citizens whose lives have been a matter of indifference to us for many years." (emphasis added.)¹¹ Regardless of the orientation of the many studies of work dissatisfaction, it is safe to make one generalization: the research has provided vastly conflicting results.

The Gallup pool shows eighty percent to ninety percent positive responses to the question, "Is your work satisfying?" It should be noted however, that the percentage of positive responses has been declining in the last ten years. Nevertheless, this is one of the highest ranges of job satisfaction that can be found in any type of study. Most researchers, for reasons that will be explained below, do not believe this means that workers are really satisfied with their jobs.¹²

The Survey Research Center of the University of Michigan, under contract from the US Department of Labor's Employment Standards Division, did a survey in the winter of 1969-70 of more than 1500 US workers drawn from all occupational levels. Their results concerning job satisfaction were somewhat less optimistic than those of the Gallup poll. Construction workers and the self-employed appear to have the best chances for satisfaction with their work. Only one out of twenty were not satisfied. Technical, professional and managerial workers were next with one out of ten dissatisfied. At the bottom were service and wholesale-retail industry workers with one out of four unhappy with their job. Workers in manufacturing had a slightly higher showing of satisfaction.¹³ Since the total number of workers in both service retail-wholesale, and manufacturing is greater than the total number of construction, self-employed, technical, professional and managerial workers (see Tables 2 and 3), the Survey Research Center figures would indicate more widespread discontent than the Gallup pool figures.

But even these figures may be too low to reflect the real level

TABLE 2

EMPLOYED PERSONS BY OCCUPATIONAL GROUP IN THE U.S. 1975

<u>Group One</u>	(thousands)
Professional and technical.....	12735.8
Managerial (including self employed).....	8867.7
Construction*.....	3493.9
Total.....	25097.4
<u>Group Two</u>	
Wholesale/retail (sales).....	5458.1
Manufacturing (including operatives).....	8291.3
Service (including private household).....	11643
Total.....	25392.4

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics 1976, (Washington, D.C.: U.S. Government Printing Office, 1976), p. 65.

*Includes carpenters who may not be employed in construction.

TABLE 3

EMPLOYED PERSONS BY OCCUPATIONAL GROUP IN CANADA 1977*

<u>Group One</u>	(thousands)
Technical, Professional and Managerial.....	2165
Self-employed**.....	497
Construction.....	725
Total.....	3387
<u>Group Two</u>	
Sales.....	1105
Manufacturing.....	1648
Service.....	1265
Total.....	4018

SOURCE: Statistics Canada, "The Labour Force", January, 1977, p.20 and Statistics Canada, Perspective Canada: A Compendium of Social Statistics, (Ottawa: Information Canada, 1974), p. 125.

*The figure for self-employed is from 1972 and should probably be lower as there has been a downward trend in this area.

**This figure is not strictly comparable to the others. It represents all persons who worked for themselves while not hiring others. Therefore

people self-employed in the occupations listed above may be counted twice. This will tend to make the Group One total larger than it should be.

of job dissatisfaction. It has been suggested by some researchers that self-esteem is far too intimately involved in the issue of satisfaction for honest answers to direct questions. Given a choice between no work and inferior work,

...the individual has no difficulty with the choice, he chooses work, pronounces himself moderately satisfied, and tells us more only if the questions become more searching. Then we learn that he...wants his son to be employed differently from himself, and if given a choice, would seek a different occupation.¹⁴

An interview with a blue-collar worker by sociologist George Strauss provides an illustration. The worker casually remarked, "I got a pretty good job." When asked what made it a good job, he replied,

Don't get me wrong. I didn't say it is a good job. It's an O.K. job--about as good a job as a guy like me might expect. The foreman leaves me alone and it pays well. But I would never call it a good job. It doesn't amount to much, but it's not bad.¹⁵

The authors of Work in America propose that one of the most useful indirect measures of job dissatisfaction has been the desire or lack of it to change type of work if given the chance.¹⁶ One study using this measure yields some information which shows the discrepancy between its results and the results of simple "Are you satisfied?" questions.

The researchers interviewed 101 blue-collar workers in Kalamazoo in 1971. They compared the responses to two questions: one, were the workers discontented with their jobs, and two, would they want to change the type of work, keep the same sort of job, or retire if they were free to choose. They found that fifty five percent of the "contented" workers would change the type of work they did. Of those who in response to a slightly different question said they would quit their present job to take almost any other job that paid as well, or if they had anything else to do, sixty five percent had reported that they were satisfied with their present job.¹⁷ These discrepancies further support the idea that the impact of self-esteem on the lack of choice perceived by many workers leads them to say that they are satisfied but that in fact they are only relatively satisfied rather than really satisfied, or to put it another way, they are satisfied under the unfortunate circumstances; "Of course I am satisfied. I don't have any other choice."

A study of job satisfaction which asked a sample of workers from a wide range of occupations, "What type of work would you try to get into if you could start all over again?" yielded interesting results. Only forty three percent of a cross section (including professionals) of white-collar workers would choose the same type of job that they already had. Twenty four percent of a cross section of blue-collar workers would choose their kind of work again. In contrast, lawyers, scientists, and mathematicians all had a similar work choice rate of over eighty percent, while ninety three percent of urban university professors would choose their profession again.¹⁸

There are reasons that have to do with something other than self esteem for why workers would say they are satisfied with a job they would also like to change if they could. These reasons concern generalized social expectations surrounding work. Satisfaction with work is obviously related to judgements about what are the proper purposes and functions of work. A job serves to structure life for many workers regardless of whether they actually like their job in a distinctly positive sense. This is illustrated by one of the results of the Quality of Employment Survey (an updated version of the earlier Survey Research Center study). The workers were asked if they would continue working even if they had enough money to live comfortably for the rest of their life. Sixty six percent said that they would. These people were then asked why. The top three reasons were:¹⁹

Keeps worker from being bored	49.8%
Work supplies direction in worker's life	16.2%
Worker enjoys working	9.7%

This calls attention to the fact that while only a very small percent actually enjoy the work they are doing, a rather large number do find something valuable about the activity of working. This is undoubtedly reflected as an upward influence on stated rates of job satisfaction in studies that do not probe very deeply.

The last comments suggest that an "additional" expectation of work that is external to the actual nature of the work itself could affect job satisfaction statistics. There are also ways that job satisfaction figures could be modified by an expectation that is

displaced from work to something else. There is for example a long history of certain religious notions regarding the role of work in an individual's life. The beliefs of some of the Protestant sects have left their mark. These sects believed alternately that work leading to secular success was a necessary precondition for salvation, or that work was a joyless burden which must be endured so that later salvation would come to the sufferer. In any case, the idea was that work is not (and in some sects even could not be, on pain of sinning) an intrinsically enjoyable activity, but something to be performed for a later reward. Delayed gratification means that one naturally does not expect any kind of immediate and significant personal satisfaction from working. It therefore becomes possible to claim "satisfaction" within these terms at a very low level of active enjoyment.

Such beliefs are no longer very prevalent in their pure form. Modern industrial society has vastly and ingeniously improved on the original versions. In the new improved version, the emphasis is no longer on the spiritual life after death but on the moment at hand, on life itself. Delayed gratification, under severe attack by the notion of instant gratification, is not to be delayed very long. The moment of salvation has become leisure time, or what one does when not at work. The enormous, organized and growing commercial invasion and promotion of leisure time highlights the central role it plays in allowing people to feel relatively satisfied with

jobs they don't like. One is not supposed to find work pleasurable since the experience of pleasure belongs to "off hours". One becomes satisfied with a generally detestable job as long as it pays enough to finance some kind of enjoyable leisure. It is within this context that consumerism has become the popular ethic of our times. Instead of the idea that being is doing (too directly related to working) stands the idea that being is having. The personal identity struggles to be defined not during the hours of work, but after and between them. Although the introductory question "What do you do?" has not disappeared, its impact is considerably mitigated by the possibility of superceding the "doing" through surrounding oneself with an appropriate collection of things consumed and, to a lesser extent, by the kind of after hours activities in which one engages.

Here lies the meaning of absenteeism. When creativity, imagination and enjoyment have been relegated to "time off" in a relatively affluent age, and when this side of the dichotomy is widely accepted as the more valuable, people will do with the lower total pay that will allow them more time of their own. Workers refuse to accept completely the distasteful boredom of work even when they are well paid for it. There is a widespread opposition to compulsory overtime, and quite commonly also refusal to take it voluntarily when it is offered. In many companies

absenteeism is most rampant on Mondays and Fridays (at General Motors absenteeism on Monday and Friday is double the usual rate) and at certain times of the year, such as the beginning of hunting season. Absenteeism is a form of resistance.

Explanations

Absenteeism as well as other signs of worker discontent pose the question of what is being resisted. Why would a large percent of workers in the samples of the studies referred to above say they would like to change jobs if they could? Much has been written on this issue. A thorough study of that matter would be beyond the scope of this thesis. However, as it is crucial to what follows, it will be briefly discussed.

In the 1973 Quality of Employment Survey, the workers were asked to rate in importance a number of pre-selected aspects of work. In order of importance, the top ones were:²⁰

1. interesting work
2. enough information to get the job done
3. co-workers friendly and helpful
4. enough help and equipment to get the job done
5. opportunity to develop special skills
6. enough authority to get the job done
7. good pay
8. supervisor is competent
9. seeing the results of one's work
10. responsibilities clearly defined
11. good job security

It is notable that seven of the top eleven aspects (leaving aside the characteristics of co-workers and supervisors) are concerned with the content of work. It is also notable that the economic aspects ranked remarkably low. Pay was not first but seventh. Higher paid workers do tend to be more satisfied according to this study, but it was pointed out that higher paid workers usually have more interesting jobs.

The Survey Research Center's list is only a beginning. It seems to underscore the importance of having adequate resources to get the job done. But this is not all that workers want and is not, in fact, what dissatisfied workers complain about.

A relatively privileged white collar woman worker who is a staff writer for an institution publishing health care literature describes her position in an interview with Studs Terkel:

I have my own office. I have a secretary. If I want a book case, I get a book case. If I want a file, I get a file. If I want to stay home, I stay home. If I want to go shopping, I go shopping. This is the first comfortable job I've ever had in my life and it is absolutely despicable.

Her comments about her job are worth quoting at length.

Jobs are not big enough for people. It's not just the assembly line worker whose job is too small for his spirit, you know? A job like mine, if you really put your spirit into it, you would sabotage immediately. You don't dare. So you absent

your spirit from it. My mind has been so divorced from my job except as a source of income, it's really absurd...Here, of all places, where I had expected to put the energy and enthusiasm and the gifts that I may have to work--it isn't happening. They expect less than you can offer. Token labor. What writing you do is writing to order. When I go for a job interview--I must leave this place!--I say, "Sure, I can bring you samples, but the ones I'm proud of are the ones the Institution never published."

It's so demeaning to be there and not be challenged. It's humiliation, because I feel I'm being forced into doing something I would never do of my own free will--which is simply waste itself. It's really not a Puritan hang-up. It's not that I want to be persecuted. It's simply that I know I'm vegetating and being paid to do exactly that. It's possible for me to sit here and read my books. But then you walk out with no sense of legitimacy! I'm being had. Somebody has bought the right to you for eight hours a day. The manner in which they use you is completely at their discretion...

You recognize yourself as a marginal person. As a person who can give only minimal assent to anything that is going on in this society: "I'm glad the electricity works." That's about it.²¹

Two things stand out immediately. The first is the absence of effective control over what will be done during the working day, even though in this case there is a semblance of such control. The second is the fragmentation of working activity into narrow little tasks which are not challenging.

This is far from being an isolated complaint. The labour of most workers, particularly in larger sized enterprises, has been molded into a highly standardized series of compartmentalized tasks or operations which are planned, coordinated and supervised by someone else who is at least a step up on a ladder of authority. The way that this affects the organization of work is dramatically illustrated by a hypothetical reconstruction of a game of bowling made over into a job.

Hiding the pins from the bowler by hanging a drape halfway down the alley...Having a "supervisor" give the bowler an opinion of how well he is doing--along with some "constructive criticism"...Changing the rules of the game and standards of performance--without involving the bowler in the change process, or even telling him why the changes were made... Preventing social interaction among bowlers... Giving most of the credit and recognition to the supervisor for performance of the bowlers under his supervision...Keeping bowlers on the job by threat of loss of job security or by paying them enough money to make their "time" in the bowling alley worth their while.²²

For greater accuracy, it should be added that the bowler be made to conform to detailed instructions on how to perform each step of getting the ball rolling down the alley.

At this point it should be emphasized once more that the kind of labour process being described is not restricted to blue collar workers, though it is true that it once was. Now

white collar work has been subjected to the same logic of organization. It has been estimated for example that a high proportion of the white collar workers employed in manufacturing enterprises follow a strictly defined procedure of repeating pre-determined tasks: in administration, eighty percent; in sales sixty percent.²³

A woman who worked for the New York Telephone Company as a customer service representative has supplied a description of the way her job was structured.²⁴ The authority is elaborately parcelled out in small bits. There is a supervisor for every five women. There is a manager for every four supervisors. There is a District Supervisor for every three managers. The Chief of the Southern Division supervises five District Supervisors. There is an army of division chiefs for the New York City area alone.

The training course is programmed. The teacher follows a book which furnishes everything down to the examples to be used. The guiding principle both in the training course and the daily job for which one is being trained is to fracture every operation into discrete parts for which there is a prescribed procedure. Any natural response to a customer must be dodified into a procedure. The customer service representative must fill out the paperwork (which is huge) required to process the customer request while speaking to the customer. Whatever may be left when the customer contact is over must be

completed later during the "closed" time when the representative is no longer receiving calls. This frustrates the natural inclination to carry an act through to its logical conclusion, and in this way creates a constant low level panic. The women learn under the pressure to hate the unusual or complex customer request and look forward to the simple and routine. They try to alleviate the pressure by transferring as many jurisdictional borderline calls to another department as they can.

Finally, it is interesting to note that these women defined themselves far more by their consumerism than by their work, "as if they were compensating for their exploitation as workers by a desperate attempt to express their individuality as consumers."²⁵ They were encouraged in this by the company which gives every employee on several pre-specified occasions each year a pre-selected, pre-fabricated little present bearing a company message. The company also runs a recruiting contest which gives employees who help to recruit new employees a number of points that add up to merit gifts from a well circulated catalogue.

Remedies

Can anything be done about jobs like that and the dissatisfaction they seem to engender? There have been in the last fifteen years some experimental projects involving the reorganization of the labour process. Work in America is, in fact, an argument that more experiments should be implemented as a national policy for the United States. The final pages of the book describe thirty three case studies in the "humanization of work" drawn from around the world. Despite this plea, most of the experimentation that has taken place has occurred in small enterprises, and many of the most successful experiments in terms of productivity have been abolished or reduced. Polaroid is a case in point. Some years ago they scrapped a remarkably successful project in the reorganization of work. Training director Ray Ferris explained why.²⁶

It was too successful. What were we going to do with the supervisors--the managers? We didn't need them anymore. Management decided that it just didn't want operators that qualified...The employees' newly revealed ability to carry more responsibility was too great a threat to the established way of doing things and to established power patterns.

And in Sweden which has been the focus of so much interest regarding "job enrichment" in recent years, a study by an official of the Swedish government's Commission on Industrial Democracy reiterates one reason why experimentation has not become widely accepted:

Both Norwegian and Swedish experience point to the fact that despite the proven superiority of workers' management on the shop floor level (both in productivity and work satisfaction) this form of organization seriously threatens the established organizational structure and managerial ethics...The goals of preserving the existing differences in power, status and incomes by far are more important values than the overall efficiency of the firm.²⁷

Additionally, it has been reported that a poll of French employers revealed that seventy five percent were hostile to the concept of work enrichment.²⁸

The above is not meant to imply that nothing positive has resulted from any attempt at job enrichment or work humanization. The question is too complex for a simple assessment such as that,²⁹ and is beyond the scope of this thesis. What needs to be pointed out is that work humanization has met with neither the widespread acceptance nor success sufficient to justify approaching it as the solution to all problems of work organization.

The preceding statements by an official of industry and of government suggest that the organization of the labor process is not (and furthermore is not seen by some key practical authorities as) a response to purely efficiency-oriented industrial motives. In fact, a certain organization of the labor process can contradict the logic of efficiency. It would appear that something more is involved. This thesis will argue that, contrary to what is commonly accepted, the organization of the labor process is a political project. It is political in the sense that it has been formed as part of a battle between conflicting interests: employee vs. employer, or more generally, capital vs. labor. The organization of the labor process reflects in its structure

a contest for ascendancy of control between workers and those for whom they work. That contest for ascendancy is part of the quest for hegemony that the business system has been pursuing on all fronts for the past few hundred years. The quest for hegemony extends beyond control of the labour process to ideological hegemony and to control of the state as well as the education system and the process of research and development. The establishment of control over the labour process has been one political victory in that quest.

It is commonly accepted, especially in North America, that work is unavoidably and inevitably unpleasant, except for the lucky few. David Jenkins, in his study of workplace democracy, summarizes that attitude succinctly:

What, then should be done about work? The most obvious answer and the most popular is: nothing.³⁰

To most people it seems unfortunate perhaps, but natural, that work will be unpleasant and alienating, as Jenkins points out:

That work could be, or should be, something other than mere punishment or drudgery is not a possibility that most workers have ever been confronted with, even on the theoretical level. It would thus hardly ever occur to the average worker to question the natural painfulness of work.³¹

David Riesman in his widely read The Lonely Crowd theorized that attempts to improve the meaningfulness of work were hopeless and that the condition of work is so without remedy that workers should seek life's meaning in leisure.³² Although he himself has since reconsidered,³³ this attitude remains quite prevalent.

If the organization of work is regarded as fundamentally predetermined by incontrovertible realities of economic efficiency alone,

then any ambition of changing it is a futile one which could only be utopian or romantically reactionary at best. However, if it were seen that the organization of work is in some way politically responsive rather than objectively fixed, then there would be at least the possibility of recognizing that work need not necessarily be constituted as it presently is, with only minor modifications.

It is beyond the scope of this thesis to discuss ways in which work could be possibly be reorganized in view of the political influences on it. This thesis is concerned rather to establish that the modern organization of work has been marked by a larger political contest for ascendancy by the business system, and to examine the way that the struggle for control of the workplace (which is part of that larger political contest) has shaped the formation of the labour process during two crucial periods.

FOOTNOTES TO CHAPTER TWO

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4. Robert S. Diamond, "What Business Thinks", Fortune, July 1970, p. 73.
5. Judson Gooding, "Blue Collar Blues on the Assembly Line", Fortune, July 1970, p. 70.
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7. "Most Jobs Could Be Done By Morons", Vancouver Sun, 21 July 1980, p. A5.
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11. Harold L. Sheppard and Neal Q. Herrick, Where Have All the Robots Gone?: Worker Dissatisfaction in the '70's (New York: Free Press, Macmillan Co., 1972), p. v.
12. Work in America, p. 14.
13. Neal Herrick, "Who's Unhappy at Work and Why," Manpower 4 (January, 1972).
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15. George Strauss, "Is There a Blue Collar Revolt Against Work?" in Work and the Quality of Life: Resource Papers for "Work in America", James O'Toole, ed., (Cambridge: M.I.T. Press, 1974) p. 55.
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FOOTNOTES TO CHAPTER TWO CONTINUED

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24. Elinor Langer, "Inside the New York Telephone Company," in Women at Work, William L. O'Neill, ed, (Chicago: Quadrangle Books, 1972), p. 307-60.
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29. For a good analysis of job enrichment, see Andrew Zimbalist, "The Limits of Work Humanization," Review of Radical Political Economics 7:2 (Summer, 1975).
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31. Jenkins, p. 53.
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FOOTNOTES TO CHAPTER TWO CONTINUED

33. David Riesman, "Leisure and Work in Post-Industrial Society" in Mass Leisure, Eric Larrabee and R. Meyersohn, eds., (Glencoe, Ill.: Free Press, 1958), p. 368-85.

CHAPTER THREE

TECHNOLOGY

The Ideology of Technology

The organization of work is the way that a society arranges people and their tools at the point of production to produce its goods and services. It comprises two closely related elements: the division of labour and technology. Their development and their relationship to each other will be traced through two key periods in modern times in the two chapters following this one in an attempt to show that the conventional ways of conceiving of their meaning are improper and inadequate. Before doing that, it is necessary to clarify our thinking about one of the two elements of the organization of work: technology.

The word "technology" contains images of machines, tools, hardware, and sometimes the manual, technical, and professional skills required for the use of the machines. The difficulty here is that an important relationship is being obscured. This difficulty resides in a category problem.

In order to talk about the operation of any complex formation, it is necessary to introduce some methodological boundaries so that it is possible to identify a smaller part in distinction from the overwhelming complexity of the whole. Language must participate in the process of boundary creation. If the words are to refer to something, this something must be marked off from the continuous nature of reality in

which there are no beginning points or end points. These must be introduced conceptually if we are going to talk about something, since we cannot, and usually do not want to, talk about everything at once.

Doing this presents no problem so long as, first, it is remembered that we are dividing reality while reality itself is not divided, and second, that we do it in a way which is not obscuring important relationships. When reality is broken up into conceptual beginnings and ends which obscure important relationships, a category problem has arisen.

When we have a category problem, the category is ideological in the sense that is it both true and not true. It explains something, but in a distorted and incomplete way. It describes the past, present and probable future in a misrepresentational way that gives rise to misconceptions when the category translates into action. The term "technology" presents a category problem.

Technology is commonly thought of as meaning the scientifically based or systematic application of mechanical, chemical, or electronic methods of getting things done. It seems to consist of such things as motor cars, blast furnaces, washing machines, television transmitters, dictaphones, etc. But this conception is too narrow because it excludes the necessary manual/mental skills required for the use of the hardware. Dictaphones tend to be found with dicta-typists (word processors) and dictators (word originators). Here we find at once a division of labor which is more than technical. It is a social division of labor. Television transmitters require receivers. They do not allow the receivers to transmit. They engender a social relationship, this time between

isolated passive receivers and a centralized unapproachable source of authority. These are only two examples of the way in which a particular kind of hardware cannot be seen in separation from its social context. It is true of any technology.

The common meaning of technology with its constellation of images of machines, tools, etc. does not take this into consideration. The machines and tools and technical processes are separated artificially from the social forms within which they are employed, separated in effect from the organization of human activities. Naturally, once this takes place, "technology" seems to take on a life of its own, an internal logic of development independent of political and social constraints. It seems to determine unalterably many of the conditions of life, including the organization of work. It is a deeply rooted notion that many of the unpleasant aspects of work are irrevocably with us for better or worse because they simply are determined by technological rationality.

To see technology as having a life of its own removes from consideration the possibility that the character of the organization of capitalist society is involved in any primary way in the form of the labor process. We can see this quite clearly in the words of Jacques Ellul, the leader of the technological pessimists:

It is useless to rail against capitalism.
Capitalism did not create our world. The
machine did.¹

And a slightly less rigid view is also revealingly familiar:

Is there a history of technology in itself? Yes and no. In our day, the answer is yes, to a certain extent: technology is linked with science and is trying to take over the world.²

Technology has become not only the syntactical subject of the sentence, but also the depoliticized subject of history. It is spoken of as if it had intentions and goals, a conscious monster extrinsic to human concerns and social control.

A double operation is necessary for the creation of such an illusion. First, certain human activities must be collected into a single word "technology" so that they become an object; then that object must be animated so that it may become a subject. This results in technological determinism which, as Jacques Ellul so ably illustrates, exonerates capitalism. It has successfully been made to appear that many facets of social life are merely rational and necessary derivatives of the advance of science and technology in a linear evolution of inevitably and universally successive stages.

While it is true that certain kinds of hardware (technology) and work organization mutually require or exclude each other, this does not in itself constitute proof of technological causality. It is only possible to reach the conclusion of technological determinism if technology as a category is constructed and used to exclude the social conditions that contain it.

Here we find the foundation of the debate over "the impact of Technology on society" --whether it is good or evil--and more specifically for the concerns of this paper, the impact on the organization

of work. But the debate (over for example whether machines caused factories) in most cases completely misses the point that the so-called effects of technology are fundamentally the results of a social system that structurally allows, encourages, and prohibits particular ways of producing what it needs. The compartmentalization between technique on one hand and social relations on the other is too sharp. In reality the two cannot be separated. Social organization is the context in which all technique is produced and introduced. All technique bears the marks of the form of social organization which is its prerequisite. A given technique may have retroactive effects on the society which developed it. But the effects, good or bad, as well as the technique are tolerated by society, or not, according to how power is distributed and to the interests of those who have power. To maintain that technology is autonomous is merely a clever way of disguising the fact that a power structure exists, in our case in favor of the owners of capital. Finally, the assumption that technology is autonomous and determining is characteristic of a kind of dogged narrow-visioned empiricism which has its face so close to the ground that it has no idea of what lies beneath the surface.

To use the category "technology" to explain the organization of work is vastly inadequate. The transition, for example, from the guild system to manufacture (in the original sense of hand work) involved no significant technical change. The library of ancient Alexandria is known to have contained a perfectly working model of a kind of steam engine which was never used but allowed to collect dust.

This contrivance had no place in the work organization of Egyptian slave society. These two seemingly unrelated facts together are examples of, on the one hand, a profound transformation in the organization of work that was not technological in origin, and on the other hand, the failure of the prototype of a supposedly revolutionary machine to have any effect on the organization of work. The underlying relations governing the organization of work must be sought elsewhere than in technological rationality.

Technology as a Relationship Rather than a Thing

Sahlins in Stone Age Economics makes the important point that technology is not just a collection of things, but rather involves the relationship between "man/tool".³ Technical development in the history of cultural evolution has not been a simple accumulation of ingenuity so much as it has been a development along a different axis of the man/tool relationship. In primitive technology, the balance was on the side of the user; the tool delivered human energy and skill. In modern technology, this relationship is reversed. Skill passes over to the tool when it becomes a machine. In a strictly formal sense, the instruments of labour come to employ the user, rather than the other way around.

To appreciate the full significance of the idea of technology as a relationship instead of a thing, it is necessary to move beyond the individual level of the man/tool relationship. That individual relationship is part of the organization of society, whether we are speaking of modern society or "primitive" society. Sahlins' study of

"primitive" societies provides a well-argued and clear demonstration of the connection.

Sahlins interprets anthropological economics as being based on what he calls the domestic mode of production, organized through the kinship lines of the extended family. The domestic mode of production consists of three systematically related components: a small labour force differentiated mainly by sex; a simple technology; and finite production goals.⁴

A simple technology is one which can largely be made and used by one person who can alone perform the entire process. It typically does not rely on or presuppose a complex division of labor. At the most, it requires the cooperation of a household group as, for example, in the making of a canoe or in some other large scale operation. It can be seen immediately that this sort of technology is admirably suited to a culture in which one man and one woman together represent nearly the entire social breakdown of productive tasks.

Sahlins has said that each of the three components of the domestic mode of production is adapted and bonded to the others. If one of these three beings to develop significant changes, it will become incompatible with the other two. Together, the three tend to be a built-in hindrance to the sort of runaway growth which is characteristic of industrialized society.

...the norm of domestic livelihood tends to be inert. It cannot move above a certain level without testing the capacities of the domestic labor

force, either directly or through the technological change required for a higher output. The standard of livelihood does not substantially increase without putting into question the existing family organization. And it has an ultimate ceiling set by the possibility of any household to provide adequate forces and relations of production.⁵

Normally (until the externalities of foreign penetration are introduced), any significant change in one of the three elements of the domestic mode of production will be constrained by negative feedback from the other two.

Sahlins' analysis is useful for showing how the relationship represented by technology is intimately connected to the social organization which contains it. The locus of the connection is the division of labor. The form of the social division of labor demands certain corresponding forms of technology. For this reason the idea of technology as a collection of things is improper. And the idea that technology determines social development, and in particular the organization of work, is also improper.

This chapter has argued that technology cannot be seen as an identifiably separate self-contained determining factor in the development and history of the organization of work. The next chapter will begin to examine how the capitalist organization of work developed, starting from the putting out system which was widespread before the Industrial Revolution, and tracing its development through the early part of the Industrial Revolution. The subsequent chapter will do the same for the next important period in this process, the end of the nineteenth and the beginning of the twentieth century.

FOOTNOTES TO CHAPTER THREE

1. Jacques Ellul, The Technological Society, (New York: Random House, 1964), p. 5.
2. F. Braudel, Capitalism and Material Life 1400-1800, (New York: Harper and Row, 1973, p. 321.
3. Marshall Sahlins, Stone Age Economics (Chicago: Aldine-Atherton, 1972), p. 79-81.
4. Sahlins, p. 87.
5. Sahlins, p. 87.

CHAPTER FOUR

WORK AND WORKERS DURING THE INDUSTRIAL REVOLUTION

Many authors who have written about the impact of capitalism on the modern organization of work have taken the end of the nineteenth century as their starting point. Although it is true that major changes occurred at that time, it was not the beginning of the capitalist organization of work. Capitalism as the predominant system of economic activity came into ascendancy long before. It came into what might be called its classic period starting about 1775 in England when the Industrial Revolution began. That is when Adam Smith's statement of classic capitalist economics was written. And it is also when capitalism began to exert its influence on the organization of work. This is when we begin to see such simple and basic elements of the modern organization of work as the centralized work location under the control and discipline of the employer, and the detail division of labour with specific tasks assigned to detail workers. Prior to this time, the organization of work did not include such simple features that are so taken for granted in today's workplace. This chapter will look at the ways that these fundamental developments were an expression of capital's need for control over the activities of workers, a need generated and easily explained by the competition for profit.

People have always worked. This much is true. But work has not

always meant what it now means. Work has not always been organized as it now is. Some of the languages of non-industrial (anthropological) societies do not have a word for work. Work has not been conceived of by them as a separate special kind of activity different from all the other activities of life. Many scholars have rather automatically interpreted this to mean that living was actually identical with working. Life was nothing but toil. One was born, one worked, one died. Despite the fact that some convincing research has been done showing that people in certain of the still surviving "primitive" societies only work from 2 to 5 hours a day to provide for their needs,¹ the idea persists that life was nothing but continuous toil. This idea is the basis for a line of reasoning which goes like this: life was hard and short for all humanity until the brilliant invention of the division of labour.² History began with the division of labor, which has been evolving towards ever greater complexity and perfection ever since, and civilization with it. We owe our present state of unprecedented prosperity ultimately to our highly advanced application of the principle of the division of labor which has allowed the accumulation of technical skill necessary for the modern standard of living. This explanation, or some variant of it, may be found in many of the public school textbooks used for civics and social studies classes. It is not confined to the realm of scholarly speculation.

Such an argument contains the assumption that the present division of labor amounts to nothing more than a quantitative improvement over older forms. As this thesis will attempt to show, this is not true.

The difference is not one of degree, but of kind. The question of what kind and why is crucial to an understanding of the present organization of work as other than objectively inevitable.

The qualitative change in question occurred during the Industrial Revolution. This chapter examines how and why that happened, based on the English experience of the Industrial Revolution. It begins by looking at the pre-industrial organization of work in the guild system. Then the rise of the putting-out system is discussed. The influence of the merchants who wanted more freedom to exercise control over their supply of product is seen as important in the beginning of the putting-out system. The putting-out system arose when production processes were removed from guild control because the control of the guilds was too restrictive for the merchants. The division of labour in the putting-out system closely resembled the previous division of labour in the guild system. But the putting-out system was an important preliminary step in the move to the industrial organization of work.

The next major development was the appearance of the centralized workplace. Workers began to be concentrated under their employer's roof. With certain exceptions, this was a novel procedure in Western Europe. It was the major step between domestic and factory organization of work. It involved no significant technological changes. In fact, it occurred before mechanization. The advantages of centralization were at first largely managerial rather than technical. These advantages will be analyzed in some detail. At first the actual division of labour was not substantially different from the domestic division of labour: the same processes were carried out in the same way under the master's roof.

It was at this point that we see the beginning of the implementation of what is known as "factory" discipline. This discipline is often explained as a feature of the modern mechanized factory, necessary for the smooth running of production. However, we will see that it was imposed independent of and prior to the introduction of machinery. Some examples are given in this chapter, and some reasons for it are proposed.

Up until this point in the early Industrial Revolution, capital, through its ownership of materials and means of production and marketing, had only formal control of the labor process. That is to say that it had succeeded in removing the labor process from the domain of the guild artisans and subordinating it to itself. This is what the transformation from the guild system through the domestic system to the centralized workshop amounts to. But these were only the preliminaries to the change to the industrial organization of work. They resulted in a purely formal control of the labor process, although it was nothing of the kind with respect to the position of the workers in the social system. Capital had not yet decomposed, reconstructed, and reorganized in its own interest the way the actual details of work itself were performed. This is what came next: the extension of real control. Again, this happened prior to widespread mechanization. In many cases, the introduction of machinery was solely and explicitly accomplished as part of the extension of real control over the organization of work. The essence of the change to real control was the move to the detail or minute division of labor as opposed to the social division of labor.

The potteries of Wedgewood will serve as the main case study. The particular advantages to management of the detail division of labor will be assessed, in part through the writings of some of the respected authorities of the time including Adam Smith, Charles Babbage, and Andrew Ure.

The last part of Chapter Three will focus on the introduction of machinery. This was the last stage in the transformation to the industrial organization of work. The introduction of machinery was not simply a technically logical process. It was often used as a lever to adjust the relationship between capital and labor. In this connection it is pertinent to look at the resistance of workers, especially the Luddites, to machinery and the way in which it was used. The Luddites have been much maligned as ignorant reactionary obstacles to the advance of industrial efficiency. But what they were fighting over was more than simply mechanization. They were very much involved in battle with high stakes over control of the labor process at a time when it was undergoing crucial changes.

The Guild System and its Division of Labor

Long before the Industrial Revolution, before even the emergence of capitalism, the essential figure in the daily provision of goods and services was the individual skilled artisan. These craftsmen belonged to guilds, or associations of those occupied in their trade. The function of these guilds has been described as:

...to regulate all activities related to their craft or crafts in their particular town, including supervision of standards of workmanship, control of admissions of freemen to the guild, conditions of apprenticeship, and regulation of the trade in raw materials and manufactured products.³

In addition, guilds specified the methods of production including amount and type of raw materials used. Guild members started by serving an apprenticeship during which they learned the trade. When the apprenticeship was completed they were journeymen or people* qualified to work in the trade. A journeyman then worked for a master or became one himself, an employer of his journeyman and apprentice, and he sold what he and his journeyman and apprentice made.⁴ Every journeyman had a reasonable hope of rising to become a master. At this period of production organization, the actual producer sold not labor but the product of labor. The producer owned both tools and raw materials. "Thus the spinners bought the wool and sold the yarn; the weaver bought the yarn and sold the cloth; etc."⁵

The division of labor in the guild system is of interest. Each worker could perform the entire process necessary for the provision of a particular product or service. No person was restricted to the performance of a specialized fragmentary task. There was "no division of labour by process involving a central organizing figure..."⁶ For example, in a shoemaker's shop, one person would not be found day in and day out cutting the leather while a second constantly sewed one part of the shoe and a third sewed a different part. It may have

*Women were represented in numerous trades during and after the period of the guild system. In the wool trade, they were involved in every branch of the industry and were apprenticed and admitted into the craft and guild.⁷

happened that one person would cut the leather for several shoes one after the other and then sew several shoes one after the other, but that is a different matter. It may seem on first sight that there is little difference between the two methods of getting work done. There is, however, a crucial difference which is that the former involves specialization of function of the worker, while the latter does not. A worker in the former method would not be a skilled craftsman while the latter would be. The first would know only how to cut leather; the second would know how to make shoes.

Guilds protected the craft and the craftsman's control over the craft. But gradually after about 1500, the strength and protection of the guilds declined so that by the end of the seventeenth century, those guilds which remained were no longer important or strong.⁸ For our purposes there were, disregarding the vicissitudes of royal plans for plunder, two separate but related developments which undermined the guilds. One was an internal struggle, the other a struggle between the guilds and outsiders. With the passage of time, the members of the guilds began to divide into two groups, one which remained oriented to manufacture for local trade, the other which oriented to trade itself and moved away from manufacture. The last group tried to restructure the guilds in their own interest so that they would be in power.⁹ Meanwhile commercial capitalists (or merchants) who bought and sold the articles made by guild masters were actively displeased with the existence of strong associations of producers. Faced with pressure from both sides, the independence of the small masters began to decline, making way for the putting-out system.

The Putting-Out System and its Division of Labor

From the merchant's point of view, guilds were a curse. It was the guild rather than the merchant that retained control of product in both quantity and quality. The Weavers of Bristol, for example, specified the width of the cloth, the amount of thread, the kind of thread, and the distance between them. Cloth found to be deficient by guild authorities was confiscated and its maker was punished by a fine or a stay in the stocks. The guilds also regulated wages within the trade and the price of finished articles.¹¹

Merchants consequently were not at liberty to do business entirely as they saw fit. Their response was to devise ways of circumventing guild control.¹² It was soon realized that there were advantages in the use of rural labor which was outside the reach of the town-based guilds. So began the putting-out or domestic system in which raw materials owned by merchants were distributed to cottagers (usually small-holding peasant farmers eager to supplement their income) who performed some part or all of the complete production process and returned their work to the merchant. The merchant continued to distribute his materials in this manner until he had a finished product to sell. Putting-out grew to become characteristic of a wide range of trades in pre-industrial England.

Woollen cloth, which was one of the most important articles of trade in England, will serve as an example. The traditional method of making woollen cloth was complex. The fleece had to be cleaned, carded

or combed, and spun into yarn. After it was woven on a hand loom, it had still to be fulled (felting the cloth or raising the nap by beating it), sheared (made smooth), and dyed. There were in England three separate areas which were prominent in the wool trade: the south-west counties, East Anglia (especially Norfolk), and the West Riding of Yorkshire. All differed in the organization of the trade.

The putting-out system in the woollen trade was represented in its most classical form in the West of England. The merchant manufacturer, or merchant clothier as he was called, was the imposing central figure, co-ordinating every stage of production. He owned the raw materials; he bought the wool, gave it to spinners, took back yarn, gave this to weavers, took back the cloth, had it finished (fulled, sheared and dyed) and finally sold the completed cloth.

The tools, at least at first, belonged to the workers. These workers, who were primarily farmers, considered themselves independent. They worked at home and were not tied to one single merchant, but rather dealt with more than one. However, this gradually changed so that by the end of the seventeenth century it was not uncommon that an outworker would be bound to a single merchant through a kind of debt-patronage. When a weaver, for example, was in debt in lean times, he borrowed from a merchant using his loom as collateral. If he defaulted, the loom went to the merchant (in title) and the weaver proceeded to pay rent for the loom that had formerly belonged to him.¹³

In the east of England, the putting-out system was also well developed, but

it differed in that there was quite commonly another middleman in the shape of the master woolcomber. Wool combing* was a very skilled trade, and wool combers enjoyed high prestige and high rates of pay and were early among the best organized and protected workers of the time. In this area of England, they themselves were putters-out, giving combed wool to spinners and selling the spun yarn to merchant clothiers who then integrated the remaining steps in the production of finished cloth in the same manner as the merchant clothiers in the south-west.¹⁴ Up to several hundred people may have been employed at once by one merchant clothier.¹⁵

The West Riding presents a rather different picture. Unlike the master clothier of the other two areas, the West Riding clothier was frequently a master clothier in his own household, meaning that the small independent weaving family was not unusual. Some of these families made the cloth almost from start to finish themselves in their home. The men carded and wove, while the women spun. Dying could also be done at home. Fulling was done in local water mills which could be used by anyone who paid. The cloth was sold in the market of the nearest town. Other families, and there were probably more of these, put wool out to be spun, the reason being that one loom provided work for five or six spinners. So in the West Riding also there were families that only spun. Some weaving families had more than one loom, and the weaver, while still himself working, had a few hired weavers under him in his house. These little master manufacturers, as they were known,

*A woolcomber used a pair of hand cards resembling wire brushes to straighten wool fibers for spinning.

only exceptionally had more than four or five looms. Their living was made also partly from the land.¹⁶

A report of the government in 1806 described the organization of the wool trade as follows:

In the domestic system, which is that of Yorkshire, the manufacture is conducted by a multitude of master manufacturers, generally possessing a very small and scarcely ever any amount of capital. They buy the wool of the dealer and, in their own houses, assisted by their wives and children, and from two or three to six or seven journeymen, they dye it, when dyeing is necessary, and through all the different stages work it up into undressed cloth.¹⁷

The term "domestic system" has come to refer interchangeably with "putting-out system" to all industry of the period between about 1500-1840 which was carried on in the homes of non-guild workers scattered about the countryside. However, it will avoid confusion here to restrict the use of the term "putting-out system" to those instances of domestic industry in which the workers were in fact providing labor for merchants or financiers who acted as a co-ordinating agent for the stages of a production process and as a middleman between the domestic workers and their market.

For these merchants, the putting-out system initially meant greater freedom from guild regulations concerning methods of production and quality as well as quantity of merchandise. It gave them greater control over the artisans who were more at the mercy of their "customers" than they formerly had been. The outworkers did not enjoy the protection of the guilds in the setting of rates of pay. While this was damaging to their position as well as further undermining the already weakened

guilds, it greatly strengthened the position of the merchants who could deal with the outworker artisans on a more direct one-to-one basis. The advantages of the putting-out system for the merchants have been summarized as follows:

Very early, urban merchants came to realize that the countryside was a reservoir of cheap labour: peasants eager to eke out the meagre income of the land by working in the off-season, wives and children with free time to prepare the man's work and assist him in his task. And though the country weaver, nail-maker or cutter was less skilled than the guildsman or journeyman of the town, he was less expensive, for the marginal utility of his time was, initially at least, low, and his agricultural resources, however modest, enabled him to get by on that much less income. Furthermore, rural putting-out was free of guild restrictions on the nature of the product, the techniques of manufacture, and the size of enterprise.¹⁸

The putting-out system grew to be characteristic of a wide range of trades in pre-industrial England. It should be apparent that its growth and the concomitant reorganization of work were due in part to the advantages they afforded to a dynamic class of commercial capitalists, the merchants. Before the onset of the Industrial Revolution, the old guild system had disintegrated and given way to the putting-out system,¹⁹ although vestiges remained. Many of the old English laws dealing with guilds were still on the books albeit nearly forgotten and not enforced.

Concentration: The Centralized Workplace

The foregoing description provides a background for an interpretation of the significant changes in the organization of work which were about to occur in connection with the Industrial Revolution. One of the most significant changes was the transformation of the place of work.

Previously, the greater part of production processes such as weaving had been carried out in either the home or a small workshop closely connected to it; hence, the name domestic industry. But immediately prior to and during the Industrial Revolution, work was increasingly performed by a larger number of workers gathered together under one roof belonging to the employer. These places were known as manufactories.

It would be misleading to say that large numbers of workers had never before been gathered into one place. Certainly large numbers were involved in enormous agricultural operations such as the plantations of the new world or vast construction projects such as cathedrals, palaces, even pyramids. But what we are here concerned with is the worker who produces a manufactured or crafted product for a market. Even these workers had been on occasion collected into centralized workshops. In the seventeenth century on the Continent there had been relatively large places of work such as the Gobelin tapestry works in Paris whose purpose was to produce high quality handcrafted luxury articles for the European royalty. However, no historical relationship can be traced between those royal workshops and modern industrial methods of production.²⁰ It is noteworthy that there was no alteration in the traditional division of labor inside the royal workshops.²¹

In England itself there had also been some proto-factories long before the Industrial Revolution. The wool works of John Winchcombe, popularly known as Jack of Newbury, had become semi-legendary:

Within one roome being large and long
 There stood two hundred loomes full strong:
 Two hundred men the truth is so
 Wrought in these loomes all in a row.
 By everyone a pretty boy
 Sate making quilts with mickle ioy:
 And in another place hard by,
 An hundred women merily
 Were carding hard with joyfull cheere
 Who singing sate with voices cleere.²²

The song or poem goes on for several more verses to chronicle the further employment of two hundred spinning maidens, one hundred and fifty child woolpickers, fifty shearmen, eighty rovers, forty dyers and twenty fullers.²³

While this description is doubtless an exaggeration, it remains quite clear that there was an extraordinarily grand wool works in Newbury in the early part of the sixteenth century. John Winchcombe was the most famous of a handful of these early entrepreneurs who gathered employees and tools under their own roof. William Stumpe was another. He carried on his cloth-making business in the mid-sixteenth century in an old abbey, every corner of which was supposed to be full of looms.²⁴

Such establishments were unique; they were considered remarkable.²⁵

In fact, they were considered a threat by both the general population and the rulers of England. The authorities were disturbed by this concentration of the "unruly" elements of society into one place. The guild workers saw these establishments as an incursion on their independence and a threat to their craft since these large enterprises did not necessarily make use of properly apprenticed and trained artisans. The authorities were also alarmed by the resulting prospect of unemployment arising among proper artisans. The injuries are summarized by the

the Weaver's Act of Philip and Mary (1555) which says:

The weavers of this realm have complained that the rich and wealthy clothiers do in many ways oppress them; some by setting up and keeping in their houses diverse looms, and keeping and maintaining them by journeymen and persons unskilful, to the decay of a great number of artificers which were brought up in the art of weaving, their families and households; some by ingrossing [accumulation] of looms into their hands and possession, and letting them out at such unreasonable rents as the poor artificers are not able to maintain themselves; some also by giving much less wages and hire for the weaving and workmanship of cloth than in times past.²⁶

Consequently, clothiers who lived outside the towns were prohibited from having more than one loom, while rural weavers could not have more than two.

Later, the workhouse for pauper children was a common form of centralized workshop. The Act of 1723 brought about the building of at least one hundred and ten across the country, although there had been some earlier.²⁷ They were popularly considered as exceedingly unpleasant places to have the misfortune of being acquainted with, and as being similar to prisons. This attitude was subsequently reproduced with respect to the large workshops and factories that became ever more widespread just before and throughout the Industrial Revolution.

None of the above examples of centralized workplaces can be properly placed among the ancestors of the modern centralized workplace. The modern centralized workplace arose from a different line of historical evolution.

The reason most often cited for the rise of centralized work places is the introduction of machinery. It seems natural to associate factories with machinery. David Landes:

The Industrial Revolution...required the use of machines which not only replaced hand labour but compelled the concentration of production in factories - in other words, machines whose appetite for energy was too large for domestic sources of power and whose mechanical superiority was sufficient to break down the resistance of the older forms of production.²⁸

Paul Mantoux in his classic work The Industrial Revolution in the Eighteenth Century:

The factory system...was the necessary outcome of the use of machinery. Plant which consisted of many interdependent parts, and which was worked from one central power station, could only be set up in one main building, where it could be supervised by a disciplined staff. This building was the factory, which admits of no other definition.²⁹

John Addy less elegantly in his study of the textile industry: "It was the steam engine which created the factory of the nineteenth century."³⁰

And D.C. Coleman (referring to the period before 1750):

The essential features of centralized production and the necessary conditions for its functioning may be set out...Four basic technical conditions may be discerned, which would not merely facilitate some sort of centralization, but would require it. First, it may be that the productive plant is a piece of fixed capital equipment to which the raw materials have to be brought for processing in some way... Second, the productive plant may be driven by power, normally in this period that of wind or falling water... Third, the production may be centralized for the simple reason that the essential process is mining or extraction... Fourth, and last, production may take the form of an assembly process.³¹

These notions of the technical determination of work organized into the factory are at the core of contemporary thinking about the inevitable logic of work organization. In fact, this way of thinking is so firmly rooted that two of the above historians lapse into it despite their own information to the contrary, as we shall see. What these explanations omit to explain is the historical precedence of concentration over the invention of power driven machinery. Although the introduction of certain mechanical inventions no doubt accelerated the process, workers were increasingly being concentrated under the employer's roof before the widespread adoption of such machinery. The factory system as an organizational form made its appearance before it was required by machinery, and it had a usefulness apart from the housing of power driven machinery.

It is interesting to note that the historical precedence of concentration over innovation has not gone entirely unrecognized by historians. The economic historians M.M. Knight et al. writing in 1927 were very clear on this point in several places. They wrote concerning the cloth industry:

Before the general introduction of power-driven machinery, there was an evident tendency, both in England and on the Continent, to group the various processes under the same roof where local conditions and the nature of the industry made it practicable.³²

and on the factory system in general:

The factory system is evidently not merely the product of a series of mechanical inventions, any more

than it is of a number of other factors. To state that inventions made it possible calls for the retort that they themselves became practicable only at certain points in the growth of capitalism and the division of labor.³³

Moving from the realm of possibility to the realm of causality, they say (though they also say that the idea of causality is merely a source of confusion in thought),

...the factory system is characterized by a concentration of personnel, by dividing up the tasks rather than the trades (as in the putting-out system). A marked tendency to concentrate the workers and the processes was visible before the appearance of power machinery. Although the mechanical inventions stimulated this, if either was a primary "cause" we must pick the one which appeared first.³⁴

The extraordinary lack of recognition of this by subsequent historiography and popular belief requires that it be explored in some detail.

Despite the connotations of the term, "Industrial Revolution", the organizational form of production did not change from the simple domestic system to the fully mechanized factory system in one giant leap. There was instead a more gradual transition in which it is possible to see the operation of motives other than technical. It is important to keep in mind that the domestic system was never straightforwardly a single method of organization even in the woolen industry inside of England alone; there were regional variations.

In the West of England, the master clothier, whose ultimate aim was to market cloth, integrated all the steps in cloth manufacture, putting out wool to spinners and yarn to weavers, cloth to fullers and shearers, and so on.³⁵ In the West Riding of Yorkshire, it was more

common than elsewhere that the integrative function resided in a self-employed person who was also a farmer. This small independent producer would buy the raw materials and himself make the cloth which he sold on the market. In either case, the work would be done in the home or in a shed next to the home.³⁶ (In this sense the term "domestic system" is more apt than "putting-out system"). However, this changed as the trade prospered. Master clothiers gathered their employees into workshops while the more successful independent farmer clothiers abandoned their farming and hired other people to work with them on their premises. Their differences began to merge into the commonality of being employers and overseers of workshops. It was these workshops which must be seen as a crucial step in the transition from the domestic system to the factory system.

Workers in other industries were also being concentrated into central locations. Workers in the hosiery trade, centered in the Midlands, used a hand powered knitting machine, invented in 1598 by William Lee, called a stocking frame. Since these machines were relatively expensive, many of the domestic knitters who had stocking frames in their home did not own the frames which instead belonged to master hosiers who rented them out. In the mid-eighteenth century by far the majority of stocking frames were in the knitters' homes which rarely held more than three, and usually held only one or two.³⁷ There were then a few merchant hosiers and middlemen who built workshops containing up to twelve stocking frames. By the end of the century, these workshops were becoming more common.³⁸ It should be

noted that this concentration had no connection with the introduction of different kinds of machinery.

In the silk trade in 1704 there was a weaving "factory" with 20 looms, although the usual number in one place was less than six.³⁹ Shortly after, in 1716 the Lombe brothers, who had discovered the closely guarded Italian secret of water powered silk throwing, set up the famous Derby silk throwing mill employing three hundred people, but

...even before the Lombes' Derby factory, we may see approaches to the factory system in the throwers' shops with their gathering together of women and children to turn wooden machinery, and in the bringing together of a number of looms under the master's roof.⁴⁰

In both the sailcloth industry and smallware manufacture it was not unusual by 1760 that workers were concentrated in the employer's establishment without benefit of the urging of new machinery.⁴¹ Also by this time the metal trades were being reorganized into central workshops.⁴² This was happening in other branches of industry too numerous to list.

It seems quite clear that the primary reason for the workshop was not technical. The techniques and tools used in these workshops at first were not different from those used in the home. The initial advantage of the workshop lay elsewhere in a number of managerial concerns, particularly in the control the workshop gave to the employer over product, and eventually process as well, which they had not previously had. Workshops provided better control over supply of product, afforded protection for the capitalist's tools and protection from embezzlement, allowed for better disciplinary control of workers, and

finally, presented the possibility of directly reorganizing the division of labor which, as we shall see, was a major development.

From the capitalist's point of view, the domestic system was bound by an internal contradiction in the area of supply of product. Precisely at the time when an expansion of the market provided an opportunity for great profits to be made, there was no way for the capitalist to induce the outworker employees to produce more. At this moment in the development of capitalism, the doctrine of the unlimited nature of human desires had not yet been implanted in the common mind. That and consumerism belong to a later period. The eighteenth century worker had a fairly inelastic conception of a decent standard of living. In other words, there was an upper limit as well as a lower limit. There was a point at which the appeal of leisure surpassed that of more income. At this point, a putter-outer had no reliable method of compelling a worker to continue producing. Raising wages only had the rather infuriating effect of putting an earlier end to the amount of labor necessary for an adequate income. Lowering wages at the time of an expanding market meant the risk of losing the worker to a higher-paying competitor. In addition, when there were attempts to cut rates, the out-workers fought back. They had possession of the master's materials, and these could be withheld to back up rate demands. Some, such as weavers and knitters, could vent their anger on their employer's rented tools which were in their possession. The merchants tried more covert forms of wage cutting such as changing measuring and weighing practices to the employers' advantage. In response, vengeful workers found ways of

reducing the value extracted from them by their employers: lowering the quality of work, embezzling, leaving work unfinished. Unfinished work was apparently such a problem that laws were passed requiring workers to execute their commitments promptly and to complete them before hiring out to another employer.⁴³

The central workshop appeared to be a solution to the problem of control over supply, a problem seemingly insoluble in the putting out system. As N.S.B. Gras has written in a study of industrial evolution,

Under one roof, or within a narrow compass, [the workers] could be started to work at sunrise and kept going till sunset, barring periods for rest and refreshment. They could be kept working six days a week. And under the penalty of loss of all employment, they could be kept going almost throughout the year.⁴⁴

But this was not the only advantage of the central workshop.

The vulnerability of the putter-outer's materials and tools in the hands of out-workers was by no means an abstract possibility.

Mantoux explains the context in which that vulnerability arose:

[Disputes between capital and labour] were frequent and violent before machinery and factories or even 'manufacture' came into being. As soon as the means of production no longer belong to the producer, and a class of men is formed who buy labour from another class, an opposition of interests must become manifest. The dominant fact, which cannot be too much emphasized, is the divorce of the producer from the means of production. The concentration of labour in factories, and the growth of great industrial centres, later gave this vital fact all its social consequences and all its historical significance. But the fact itself appeared at an earlier date,

and its first effects made themselves felt long before it reached maturity as the result of the technical revolution.⁴⁵

Many groups of artisans had formed combinations (an early kind of trade union) shortly after the beginning of the eighteenth century partially for the purpose of regulating the rates paid to them. Wool weavers in the southwest had by 1717 formed a combination which was severely denounced in a royal proclamation describing such combinations as:

lawless clubs and societies which had illegally presumed to use a common seal, and to act as Bodies Corporate, by making and unlawfully conspiring to execute certain By-laws or Orders, whereby they pretend to determine who had a right to the Trade, what and how many Apprentices and Journeymen each man should keep at once, together with the prices of all their manufactures, and the manner and materials of which they should be wrought.⁴⁶

This royal disapproval of what had formerly been the legitimate ambitions of the guilds did not discourage the weavers from terrifying the clothiers by destroying their goods, for in 1725, at the clothiers' request, a law was enacted prohibiting any combination of the weavers for the goal of raising wages or regulating the trade and providing the death penalty or transportation for the destruction of goods during a strike. Nevertheless, the weavers' organizations did not disappear, not did the practice of applying pressure through the destruction of property cease.⁴⁷ And the weavers weren't alone.

Earlier in London in 1710, the framework knitters, whose frames belonged to the masters, became enraged by the masters' use of too many

workhouse children, a practice which reduced both their employment and wages. When the masters refused to relent, the knitters replied by destroying their frames.⁴⁸ Mantoux states that "Such events were very frequent during the period immediately preceeding the Industrial Revolution."⁴⁹ For example, in 1763 when the silk masters declined to pay what the silk weavers felt to be a fair rate, two thousand of them went out on strike after destroying all materials and tools.⁵⁰ Given these conditions, it is not surprising that merchant manufacturers would begin to see a certain measure of security in a workshop that gathered their tools, materials, and workers within their reach. Although this security was by no means a guarantee of peace (as would soon be learned) it did represent a substantial reduction of vulnerability.

The central workshop also provided protection to tools from a different managerial point of view. At a time when competition was rather cutthroat to market cheap versions of expensive hand made items such as luxury clothing, any entrepreneur who came up with a new modification in his technique of production was in danger of being undermined by having it stolen by a competitor. Patents were notoriously difficult to maintain. In these circumstances, some merchant manufactures built workshops purely to serve as a safe receptacle for a modified piece of equipment in order to keep an advantage in the market.

The story of Samuel Fellows (1687-1765), "who pioneered the concentration of production in the textile trades in (Nottingham)",⁵¹ is a case in point. He is said to have gone to Nottingham in about 1706 from

London, where he was born, to avoid the restrictions on the excessive use of pauper apprentices that the framework knitters were insisting upon and which led to the previously mentioned destruction of 2000 frames in 1710. In Nottingham he took advantage of his distance from the London Company of Framework Knitters by setting up a workshop employing large numbers of child pauper apprentices at a low rate. This turned out to be very profitable and his business grew. Around 1730 he began to specialize in silk hosiery and other fashion items which required the alteration of the meshes on the frames. Fellows bought some of these specially altered frames and built "a large factory" in which to conceal them. "The idea was taken up by successive hosiers who sponsored innovation so that, by the time Arkwright [who is usually thought of as the father of the factory] came to Nottingham the factory could be recognized as a location of production commonly used by innovators."⁵²

These 'factories' were not the factory that we think of, i.e., with rows of interconnected power driven machinery; the new machines involved were nothing more than minor alterations and modifications of the stocking frame first developed in 1598. The "factories" were protective armor for these valuable properties. They were sometimes built with only skylights to keep out prying eyes.⁵³ But even this did not defeat the more determined usurpers who, by going to the length of boring holes in the walls to get a look, were known to have driven at least one inventor (Samuel Crompton who developed the self-acting mule for spinning) to make his secret public.⁵⁴

Embezzlement was another problem with the putting-out system for masters. Domestic workers who received raw materials from the masters would keep a little and sell it on the black market when they felt that they were not given proper compensation for their labors or when they were in periods of poverty. They dampened the yarn with grease or butter to give it false weight, or stretched the cloth to make it look bigger. They did not think this involved any moral turpitude: on the contrary, it was regarded as quite justified by their exploitation at the hands of the masters. In fact, some of the masters were former outworkers who had accumulated enough capital in this way to set themselves up as manufacturers. And according to Prof. Landes, "...the worker's predilection for embezzlement, sharpened in depression by the desire to compensate for increased abatements and lack of work, was nowise dulled in prosperity; on the contrary, the reward for theft was greater."⁵⁵

The magnitude of the embezzlement problem is indicated by the history of legislation enacted to deal with it. Since at least the first of the eighteenth century, Parliament was pressed by master manufacturers to pass increasingly strict laws against embezzlement. The first victory came in 1703, at the request of the Lanchashire cotton traders, in the form of a law which upgraded the century old punishment for embezzling (stocks or whipping) by specifying a fine for double the damages, with whipping and 14 days of imprisoned hard labor for default. This law treated the embezzler as a person who had breached a contract. But 1749 saw the enactment of a more punitive law which treated the

offender as a criminal by dispensing with the fine and imposing an immediate 14 day prison sentence. These acts, though instigated by pressure from the textile masters, applied to domestic industry generally, including iron, leather, fur, flax and hat manufacturers as well as others.

Even this last act did not have the result the employers would have liked for, according to Pollard, "The problem, significantly, appears to have assumed major proportions only in the third quarter of the century though the [domestic] system itself was centuries old."⁵⁶ The masters in many areas found it necessary to form combinations for the purpose of prosecuting the embezzlers. In 1764 the worsted masters formed such a committee which appointed people to roam about gathering information useful in proceeding with prosecutions. This plan fell apart, possibly because there were many masters involved in buying cheap wool from the embezzlers. The Manchester cotton spinning masters joined together to combat embezzlement in 1766. Rewards were offered to informers in 1772 by "an influential committee of manufacturers and crofters." Again in 1773 the worsted yarn masters appointed inspectors.⁵⁷

Four years later came the Worsted Act which was quite extreme under English law. Conviction could be secured on mere suspicion supported only by the oath of an employer, inspector, or "credible witness." Employers and constables had special rights of search which allowed them to inspect the house of anyone thought to have embezzled. Furthermore,

a worker who had not returned his materials within eight days was considered to have embezzled them. It would seem that this law went so far as to violate the premise of the English legal system that an accused was deemed to be innocent until proven otherwise. In this case, anyone suspected of embezzlement would be arrested and presumed guilty unless he could prove his innocence.⁵⁸ The severity of the act indicates the extent to which the problem was seen as critical.

The gathering of workers onto their own property was explicitly viewed by some master manufacturers as a way to prevent theft of their materials. According to testimony given in 1802 before the parliamentary committee on the Woollen Clothiers Petition, "The principal motive of the Clothiers who have weaving at home is to guard themselves from those Embezzlements which take place to an enormous extent in the Houses of the Weavers."⁵⁹

Discipline

The problems for the new breed of entrepreneurs of control of supply and protection of tools and materials were related to the extension and maintenance of discipline among workers. Obviously it was easier to enforce such discipline among workers who were within reach than it was among workers scattered about the countryside. So the centralized workshop allowed in a general sense the establishment of a discipline which sought to put an end to the abuse of tools and materials and to establish the subordination of work habits to the necessity of predictable and reliable supply of product. It was with this in mind that Gras wrote, "[The central workshop] was purely for purposes of discipline, so that the

workers could be effectively controlled under the supervision of foremen."⁶⁰ and that, "The central workshop in the modern period did for discipline what slavery had accomplished in ancient times."⁶¹

But in a more particular sense, the central workshop created an entirely new set of discipline problems which were based in the fact that the organization of work into a central location was in direct opposition to the life and culture of the workers who were employed in it. This was the first generation to be subjected to such an experience. There was every reason for them to not automatically accept the supposed necessity of a new rigid and arbitrary relation to work.

The rhythm of work patterns before the Industrial Revolution was not regular. Labour was constant throughout neither the day, week, nor year. The domestic worker had a great variety of tasks surrounding the performance of his or her occupation. Extracts from the diary of a farming weaver from 1782-3, quoted by E. P. Thompson, shows how they varied.

On rainy day he might weave 8½ or 9 yards; on October 14th he carried his finished piece, and so wove only 4 ¾ yards; on the 23rd he "worked out" till 3 o'clock, wove two yards before sun set, "clotted (mended) my coat in the evening". On December 24th "wove 2 yards before 11 o'clock. I was laying up the coal heap, sweeping the roof and walls of the kitchen and laying the muck midden (midden?) till 10 o'clock at night". Apart from harvesting and threshing, churning, ditching and gardening, we have these entries:

January 18, 1783: "I was employed in preparing
Tops of three Plain Trees home
which grew in the Lane and was
that day cut down & sold to John
Blagbrough."

January 21st: "Wove 2 3/4 yards the Cow having calved she required much attendance". (On the next day he walked to Halifax to buy a medicine for the cow.)

On January 25th he wove 2 yards, walked to a nearby village, and did "sundry jobs about the lathe and in the yard & wrote a letter in the evening". Other occupations include jobbing with a horse and cart, picking cherries, working on a mill⁶² dam, attending a Baptist association and a public hanging.

For a domestic worker, the daily tasks depended in part on the time of the year. Nearly everyone put down their regular work during harvest time and for the other annual chores in a life that is closely related to the land. In addition, the hours of work expanded and contracted with the length of the day so that labor was longer in the summer. The work cycle of the year was also broken up by a number of traditional holidays and fairs as well as funerals which were cause for great and long wakes.

The work week had a pattern of its own within the larger pattern of the year. There were not many trades which did not honor Saint Monday as a day of rest or a day in which to take care of personal business. Work was slow on Tuesday and gradually built up to a fever pitch on Friday and Saturday in order to get the week's work finished: "On Monday or Tuesday, according to tradition, the hand-loom went to the slow chant of Plen-ty of Time, Plen-ty of Time: on Thursday and Friday, A day t'lat, A day t'lat."⁶³

Here is one rather ironic view of this from 1639:
 You know that Munday to Sundayes brother;
 Tuesday is such another;
 Wednesday you must go to Church and pray;
 Thursday is half-holiday;
 On Friday it is too late to begin to spin:
 The Saturday is half-holiday agen.⁶⁴

And a more irate view from 1681:

When the framework knitters or makers of silk stockings had a great price for their work, they have been observed seldom to work on Mondays and Tuesdays but to spend most of their time at the ale-house or nine-pins ...The Weavers, 'tis common with them to be drunk on Monday, have their head-ache on Tuesday, and their tools out of order on Wednesday. As for the shoemakers, they'll rather be hanged than not remember St. Crispin on Monday...and it commonly holds as long as they have a penny of money or pennyworth of credit.⁶⁵

This kind of irregularity of working habits, the "alternate bouts of intense labour and idleness," proved to be intolerable to the early owners of centralized workplaces. These men almost invariably found it necessary to initiate an attack on those habits. The attack was, of course, vastly intensified with the use of power driven machine factories. But this is not to say that these factories caused the assault on work habits and the accompanying assault on popular culture. The power factories of modern industry presuppose the establishment of regularity in attendance to the task and the machine. Consequently, discipline intensified with them. Nevertheless, the capitalist managerial requirement for disciplined regularity predated the moment in which machinery presupposed it. This can be quite clearly seen in the efforts of early large workshop masters, and in the general religious and moral din against the supposed idleness and slothfulness of the "lower classes," a din which had previously existed but heightened dramatically in the years leading up to and following the end of the eighteenth century.

Perhaps the earliest example of such efforts is to be found in the extraordinary Law Book of Sir Ambrose Crowley. Crowley started out as an ordinary working blacksmith and became one of the most successful

entrepreneurs of his time (he was worth 200,000 pounds when he died)⁶⁷ as well as a knight and member of Parliament. By the end of the 16th century he was the master of a huge ironworks in the North of England which consisted partly of rolling, plating and slitting mills to forge pig iron and furnaces for steel, and partly of many small hand work shops for making nails (which was the foundation of the business) and other iron products such as tools of all sorts, frying pans, chain, anchors, hinges, barrel hoops, etc.⁶⁸ All of this Crowley managed by mail from London which was the heart of his retail trade.

In order to govern his recalcitrant workforce, Crowley established a complete constitutional code of conduct and procedures which set forth in minute detail the duties, responsibilities, and penalties for misconduct for every person from the principal officers to the manual laborers. His goal was that every moment of his employees' lives should be oriented towards making his enterprise a profitable one.⁶⁹

Excerpts from some of the preambles of his more than one hundred laws reveal his sense of outrage at the working habits of his employees.⁷⁰

From Law 16:

Whereas I have had great and grievous complaints of my workmen loseing much time for want of regular method and certain time of reckoning and legall demanding of the same, and...considering that the workmen's time is their livelihood and that they ought in justice to be speedily and cheefully dispatcht...⁷¹

From Law 40:

I have by sundry people working by the day with the connivence of the clerks been horribly cheated and paid for much more time than in good conscience I ought and such hath been the baseness & treachery of sundry clerks that they have concealed the sloath & negligence of those paid by the day...⁷²

From Law 103

Whereas it hath been found by sundry I have employed by the day have made no conscience in doing a day's work for a day's wages, nor have not had a due regard in doing their duty by labouring to do their utmost in the lawfull propagating my interest and answer the end of their being paid...On the other hand, some have due regard for justice and will put forth themselves to answer their agreement and the trust imposed in them and will exceed their hours rather than the service shall suffer.⁷³

Some have pretended a sort of right to loyter, thinking by their readiness and ability to do sufficient in less time than others. Others have been so foolish to think bare attendance without being employed in business is sufficient ...Other so impudent as to glory in their villany and upbrade others for their diligence...⁷⁴

The details of Crowley's constitution or managerial scheme, though fascinating, are too elaborate to get into (the Law Book is over 100,000 words).⁷⁵ However, it is appropriate here to explain some of the points relating to time discipline. Crowley appointed officials, called the Monitor at one mill and the Warden of the Mill at another, to be time-keepers. Their duties included keeping "time papers" for each employee paid by the day in which they were to note the moment of arrival and departure. But they were to subtract time for "being at taverns, ale-houses, coffee houses, breakfast, dinner, playing, sleeping, smoaking, singing, reading of news history, quarelling, contention, disputes or anything foreign to my business, any way loytering."⁷⁶ The Monitor and Warden of the Mill were to make random spot checks in the offices at least twice a day in order to discover who might be shirking their appointed tasks so that it could be recorded in case any clerk tried to claim time he had not been working. They had to ring bells announcing the start and finish of the working day and at meal times.⁷⁷ Crowley

also carried one step further his notion of time in his employment by requiring his time keepers to ensure that "no person shall have any time allowed them for being in company, in drinking with any person, although at that time they are doing my business" and that "no person shall have anytime allowed them for smoaking although they are in my business at the same time."⁷⁸ (emphasis mine) Once a week the time-keeper had to post his record with a deposition stating that, "this account of time is done without favour or affection, ill-will or hatred, & do really believe the persons above mentioned have worked in the service of John Crowley Esq [the son] the hours above charged."⁷⁹

Crowley also placed himself firmly at the head of a long tradition of employers who became fixated on control of the actual clock used for regulating the daily movements of employees.

The law defining the Monitor's duties says:

"And whereas I have been informed that sundry clerks have been so unjust as to reckon by clocks going the fastest and the bell ringing before the hour for their going from business, and clocks going too slow and the bell ringing after the hour for their coming to business, and those two black traitors Fowell and Skellerne have knowingly allowed the same; it is therefore ordered that no person upon the account doth reckon by any other clock, bell, watch or dyall but the Monitor's which clock is never to be altered but by the clockkeeper."⁸⁰ (Emphasis mine-- Crowley set up a system of rewarding informers who reported when someone was not performing according to the laws governing them.⁸¹)

And the warden was to guarantee that the clock was

"so locked up that it may not be in the power of any person to alter the same."⁸²

More than a century later, factory masters were still concerned

to have the last (and only) say on clocks, as this worker testifies:

I have worked at Mr. Braid's mill. There we worked as long as we could see in summer time, and I could not say at what hour it was that we stopped. There was nobody but the master and the master's son who had a watch, and we did not know the time. There was one man who had a watch...it was taken from him and given into the master's custody because he had told the men the time of day...

And at another mill, despite the battle for regularity which has often been spoken of as a simple requirement of machinery:

...in reality there were no regular hours: masters and managers did with us as they liked. The clocks at the factories were often put forward in the morning and back at night, and instead of being instruments for the measurement of time, they were used as cloaks for cheaterly and oppression. Though this was known amongst the hands, all were afraid to speak, and a workman then was afraid to carry a watch, as it was no uncommon event to dismiss any one who presumed to know too much about the science of horology. 83

Crowley, although he constantly railed against the villainy and treachery of his employees, must have been fairly successful in imposing his discipline, for his firm flourished. But several generations later in the latter half of the eighteenth century his entrepreneurial successors still confronted the same problem.

The complaint of Edward Cave, owner of a hand cotton spinning workshop in the early 1740's, is typical: "I have not half my people come to work today, and have no great fascination in the prospect I have to put myself in the power of such people."⁸⁴ Before the rise of the power factory, working people, especially those whose trade carried a measure of pride in independence and craft, already resented the constraints of the central workshops. A journeyman weaver declared as late

as 1806 that he would not go into a hand loom shop because of his repugnance to "being confined to go exactly at such an hour and minute..." and he testified before the Committee on the Woollen Trade that:

A tender man when he had his work at home could do it as his leisure: there you must come at the time: the bell rings at half past five, and then again at six, then ten minutes was allowed for the door to be open; if eleven expired, it was shut against any person either man, woman, or child; there you must stand out of door or return home till eight.⁸⁵

This kind of rigidity meant in a very real sense that the working person, the artisan who actually made the product, was no longer the master of his own time and was reduced to the status of a servant. Regardless of the fact that these artisans had not in the immediate past been completely independent (being in a kind of employer-employee relationship) this new rigidity was felt to be a degradation of their status.

Central workshops were also felt to be an evil because they tore apart the family. Thompson describes how a domestic weaving family worked:

Weaving had offered employment to the whole family, even when spinning was withdrawn from the home. The young children winding bobbins, older children watching the faults, picking over the cloth, or helping to throw the shuttle in the broad loom; adolescents working a second or third loom; the wife taking a turn at weaving in and among her domestic employments. The family was together, and however poor meals were, at least they could sit down at chosen times. A whole pattern of family and community life had grown up around the loom-shops; work did not prevent conversation or singing.⁸⁶

But when spinning was gathered into one place, and weaving into another, the women and children went off to the first and the men to the second. This was nothing less than a frontal assault on working class culture.

For this assault to be successful it had to be generalized. And it was. The obsession with discipline was not confined to the interior of work places. Rather it became expanded in the latter half of the eighteenth century, and especially around the turn of the century, to include a widespread religious attack on the "character of the lower orders", a general moral outrage against working class leisure and "disoluteness", and the deployment of education as a weapon in the battle against it. What all this amounted to was an attempt, not always conscious but sometimes so, to transform the culture of working people so that they would be responsive to the incentives with which an industrial or industrializing capitalist society hoped to motivate the efforts of human labor. In particular, a reconstruction of "respectability" was mounted, for without a desire to be "respectable", workers would not internalize the necessity of obeying discipline and accepting their employer's precepts about proper conduct. They might be forced into obedience through the severity of sanctions imposed, but this is qualitatively inferior, from the employer's viewpoint, to a kind of willing compliance.

It is within this context that we can interpret the astonishing range of infractions for which fines were extracted in the early workshops and factories. We have the record of offenses for which the Strutt family (previously partners with Arkwright, so-called

father of the factory system) fined the workers in their cotton spinning factory in the early years of the nineteenth century. Aside from the predictable offenses of absence without permission, theft or destruction of company property, and failure to perform the work properly, we read an incredible list of apparently gratuitous censures including the following:⁸⁷

Frequently looking through the window
 Calling through the window to some soldiers
 Making noises in the counting house
 Riding on each other's back
 Making a noise when ordered not
 Dancing in the room
 Quarreling
 Telling lies
 Using ill-language
 Fighting
 Playing Tricks
 Being saucy
 Talking
 "Terrifying S. Pearson with her ugly face"

And the Strutts saw fit to levy fines for misconduct outside working hours as well. The offences which resulted in a fine include putting someone's dog in a bucket of hot water, receiving stolen potatoes, and rubbing the face with blood to scare people.⁸⁸

The name of Richard Arkwright, who was in his time and still is regarded as the creator par excellence of the factory system (Ashton says "Arkwright's technique, and his methods of organizing labour, were copied by literally hundreds of master cotton spinners in England, Scotland, and Wales."⁸⁹), is closely associated with the extension of labor discipline. Mantoux says that, "His most original achievement was the discipline he established in his mills." And Ure in his

apotheosis of the factory system written in 1835 says of Arkwright, after describing the failure about 40 years earlier than him of an entrepreneur who invented nearly the same mechanical improvement that Arkwright later employed to great success but who "was of a gentle and passive spirit" (Lewis Paul),

It required, in fact, a man of Napoleonic nerve and ambition, to subdue the refractory tempers of work-people accustomed to irregular paroxysms of diligence, and to urge on his multifarious and intricate constructions in the face of prejudice, passion and envy. Such was Arkwright, who suffering nothing to stay or turn aside his progress, arrived gloriously at the goal, and has for ever affixed his name to a great era in the annals of mankind, an era which has laid open unbounded prospects of wealth and comfort to the industrious, however much they have been occasionally clouded by ignorance and folly.⁹⁰

One cannot help but be embarrassed by such unashamed adulation of an autocrat.

Control of the Labor Process;
the Minute Division of Labor

The obsession with discipline, which was so pronounced just before and during the Industrial Revolution, was integrally related to a profound transformation occurring at that time in the labor process. To understand the significance of this transformation, certain points about the development of capitalism must be kept in mind. Capitalist society is characterized, among other things, by two related but quite distinct structures of control. One is the structure of control over the means of production which lies in the development of private property ownership. The other is the structure of control over the labor process which is implemented through, or allowed by, proprietary control of the means of production. The former historically precedes the latter. It originated with the commoditization of land, labor and capital, and with the private appropriation of the products of labor by capital. In the early period of capitalism, capital had only formal control of the labor process itself, which remained essentially unchanged. Today, capital has real control, which is to say that the labor process has been decomposed, re-organized, and reconstructed to conform to the interests of capital. This re-organization began in earnest during the early part of the Industrial Revolution in the form of the re-division of labor under the initiatives of the more successful employers. However, it did not end with the Industrial Revolution, as shall be seen later.

As mentioned above, there is a line of reasoning which attributes the comforts of civilization ultimately to the development and constantly increasing extension of the application of the division of labor, and to the technical advances based upon it. This explanation treats all forms of the division of labor as of the same type: more specifically it omits to recognize that there was a qualitative break in the form of the division of labor which became predominant in the earlier part of the Industrial Revolution. That qualitative change must be characterized as part of any useful interpretation of the organization of work. Simply stated, the division of labor in society is different from the division of labor inside a workshop or manufactory.⁹¹ The division of function into butcher, baker, candlestick-maker is not the same as division of function into leather-dyer, leather-cutter, and leather-sewer, for example.

The first allows the possibility of some form of independence, because the worker is a craftworker who has produced a complete product over which he or she has disposal, or at least has a trade for which there is a fairly wide market. The second kind of worker is a considerably more vulnerable position, because he or she produces no saleable commodity (or at least not one for which there is a wide market), but only performs a part of the process of making a product. Their labor in fact is useless without some way of co-ordinating it directly with the complementary labor of others. Such a division of labor requires a co-ordinative function.

But this is an abstraction which may be misleading. The

impression should not be given that the advance in the social division of labor grew of its own accord to such a point that it called forth the existence of the capitalist as a figure who could provide the necessary integrative function, as a figure without whom there would have been chaos. In fact, the reverse was true. It was historically the requirements of capital which pushed forward the division of labor.

However, this does not mean to say that the combined productivity of collective labor which stems from the division of labor can be had only under the auspices of the control of capital. This productivity appears to belong to the capitalist who presently combines (and historically combined) workers in a more extreme division of labor.⁹²

As such, it goes a long way toward legitimizing capitalist organization of the economy by virtue of the efficiency which appears to belong to it. But it would seem that there is in fact no economic reason why this productivity would not arise from a division of labor under the control of workers.⁹³ Abstractly, in traditional economics, labor could employ capital as well as capital employs labor. We know that in a capitalist economy this is nothing more than an abstraction.

Returning to the aforementioned qualitative transformation of the division of labor, the craft division of labour (butcher, baker, candlestick maker) was distinguished from what can be called the detail or minute division of labor.⁹⁴ It was said that the former allowed some independence while the latter required subordination to an overall integrative figure, otherwise known in this historical instance as the capitalist. This is not strictly true. Over a relatively long period

of social time (generations), craft workers had been seeing their independence gradually undermined by the rising strength of capitalist enterprise. This corresponds with the period in which capital was gaining formal control of the labor process, and set the stage for the subsequent qualitative transformation in which capital gained real control of the labor process. Once the formal control of capital had asserted itself by converting artisans into employees under the putting-out or domestic system in the way explained above, it became apparent that it was in the interest of capital to push far beyond the traditional known limits of the existing division of labor. We can see this first in the domestic system in the refining of the functions of various workers so that the extent of their craft was narrowed or broken into smaller parts of the overall process. This was only the beginning. It was after workers were gathered into the central workshop that we see the decisive steps.

In order to keep it clearly understood what we are talking about, we shall return to the question of why a radically new division of labor was in the interest of capital after we have explained what the new division of labor looked like.

We can take as our example the metal-working industry.⁹⁵ In the early part of the eighteenth century, the industry was composed of many special trades, each separate from the other, using different kinds of metals and making different kinds of finished articles. They were organized along the lines of the domestic industry, but also retained fairly strong and strict guild-type regulation. Generally, the master artisans sold their

products to merchants. But gradually the more successful became direct traders themselves. They began to collect the different branches of the industry together into their own workshops. For example, Joseph Hancock in 1765 owned six workshops in Sheffield (one of the centers of the metal industry) which combined all the trades of the area. Matthew Boulton (before he joined with Watt to form the partnership that would supply the steam engine to the Industrial Revolution) at the Soho Works had an establishment which made every kind of article produced in the entire Birmingham repertoire.

Concerning these events, Mantoux wrote:

This grouping together of different and previously separate branches of work was only one of the results of that tendency towards concentration which manifested itself in all industries at the same time. Another, and probably a more important result (certainly a more far-reaching one) was the subdivision of technical processes within each branch into an ever-increasing number of fragmentary operations, each of which was entrusted to a special workman or group of workmen. This classical form of the division of labor showed itself nowhere earlier or more clearly than in the secondary metal-working industries. It was from one of them that Adam Smith took the well-known example which is described in the first page of his Essay on the Nature and Causes of the Wealth of Nations.⁹⁶

Here is Adam Smith's famous description:

...in the way in which this business is now carried on, not only the whole work is a peculiar trade, but it is divided into a number of branches of which the greater part are likewise trades. One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations; to put it on, is a peculiar business, to whiten the wire is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner,

divided into about eighteen distinct operations, which, in some manufactories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them.⁹⁷

What we are looking at here is a group of people who are constantly employed in a single or a few minute operations. This is not an example of a craftworker known as a pin-maker who makes pins. It is not even a situation in which a pin-maker is employed in a consecutive series of operations which are performed many times before moving to the next. We are looking at a detail worker, i.e. someone whose function is restricted to the repetition of a very circumscribed set of operations which acquire their usefulness and meaning only in the context of the overall production process of which it is but a small part.

This description of detail work conforms to the usual conception of factory work as we think of it in the present day. So much so that we even tend automatically to think that this kind of work exists because the technical basis of factory production makes it necessary. Melvin Kranzberg, for example, in his study of work in the western world speaks about "...the new division of labor imposed by machines,"⁹⁸ and says that "the introduction of machines brought quite a different situation" from the craft guild type of work organization.⁹⁹ It seems to be an objective technical necessity rather than a social project that work should have the character that it began to take on during the Industrial Revolution. However, the fact that this kind of work organization appeared before machine factories (or "modern industry") constitutes

a profound attack on this generally accepted idea.

That this idea is so uncritically accepted is demonstrated by Kranzberg himself who approvingly quotes Adam Smith to support his position, without noticing that Smith actually contradicts it. He cites the above account of the metal trades as illustrative of the new division of labor brought about by machines, even though the account begins as follows:

A workman not educated to this business (which the division of labor has rendered a distinct trade) nor acquainted with the use of the machinery employed in it (to the invention of which the same division of labor has probably given occasion)...¹⁰⁰
(emphasis mine)

And later Kranzberg quotes a section from Smith again which even more clearly contradicts his own position:

A great part of the machines made use of in those manufactures in which labor is most subdivided were originally the invention of common workmen who, being each of them employed in some very simple operation, naturally turned their thoughts toward finding out easier and readier methods of performing it.¹⁰¹

We have seen that the detail division of labor had been established in the metal working trades at an early date (before they were mechanized.) There is another famous example which cannot be neglected, which is that of Wedgewood the potter. Pollard, a student of management history, writes that, "Boulton and Fothergill at Soho (metal trades), and Wedgewood at Etruria, obtained virtually all their...advantages in production from a skillful use of the division of labor..."¹⁰² Ashton is a little more specific: he writes that it was the intensification of the division of labor which was Wedgewood's great success.¹⁰³

The potting industry up until the time of Wedgewood was based on the expanded domestic system of organization. A master potter worked with one oven, 6 journeymen at the most, and a few boys. According to Mantoux, the division of labor was as follows:

One man shaped pots, another made the handles and put them on, whilst the others did the decoration, the glazing and the firing. But they were none of them specialists, for a good workman had to know everything and to be able to turn his hand to anything.¹⁰⁴

At this point the potting industry was not characterized by a detail division of labor because, although a worker might perform one part of the overall process over and over again for a time, his knowledge, skill, and function was not limited to that particular task, but encompassed the whole process. The journeymen potters were accustomed to "pass from one kind of labor to another, just as impulse or convenience prompted."¹⁰⁵ It was Wedgewood's intention to change all that.

Josiah Wedgewood, son of a potter and himself a potter, was a very ambitious businessman. He had soon sufficiently expanded his business to be able in 1769, at the age of 39, to open a new establishment called Etruria, whose design contained all his ideas about how to organize labor. His premise was the strict separation of different processes and the rigid division of labor.

He designed a system in which each important process in the production of pottery would be carried out in a separate workshop. He required that his workers conform to this arrangement in that each one was assigned to one particular task in one of the workshops. Neil

McKendrick, a student of Wedgewood's operations writes,

His workmen were not allowed to wander at will from one task to another as the workmen did in the pre-Wedgewood potteries. They were trained to one particular task and they had to stick to it.¹⁰⁶

Out of Wedgewood's 278 workers in 1790, only 5 had no assigned post. There were at least 37 different posts, not counting the clerical ones. A worker in one kind of clay was not allowed to work with any other kind, though the job might otherwise be the same.¹⁰⁷

It is fairly clear that mechanical innovations had nothing to do with Wedgewood's restructuring of the labor process, although he did introduce the use of the mechanical lathe in the potting industry.

One historian of the potting industry wrote that,

Up to the year 1845, the potting industry had remained almost completely unaffected by the scientific and mechanical improvements which had greatly modified some trades, and had revolutionized others. The whole range of mechanical science was almost solely represented in the manufacture of potting by the throwers' wheels - identical in mechanical principle, and practically so in form, with that used by the ancient Egyptians - and the turners' lathe.¹⁰⁸

The Hammonds add, "Perhaps the most surprising fact about the development of the Potteries was that mechanical power played no part in it."¹⁰⁹

Pollard agrees. He says, "Wedgewood...who was helped by no startling mechanical invention, imposed a system of 'specialization and hitherto unheard-of division of labour'."¹¹⁰ In view of this, we must inquire why Wedgewood developed a detail division of labor involving the complete separation of tasks and the strict adherence of workers to only one.

Among Wedgwood's many pre-occupations was the fear that his workers would take his secrets to another employer, especially a foreign one. This was not an idle threat. The competition from foreign rivals especially was fierce. Indeed, one of his own ancestors, Dr. Thomas Wedgwood, had made a tidy business out of using an improvement in glazing which two partners had stolen from Dutch potter, whose own precautions were said to be so elaborate that he had built a speaking tube a mile long from his house to his works to warn of visitors.¹¹¹ Wedgwood was very active in pushing for laws to prevent emigration, and went to extraordinary lengths in suggesting how the powers of the state could be used in limiting the freedom of English workers. He proposed rewards for officers who apprehended would-be emigrees, rewards for informers, and the opening of mail belonging to suspected offenders. He believed however that it was "much better to prevent crimes than to have them to punish."¹¹²

Although these activities belonged to a later period in his life than the building of Etruria, this preoccupation played a role in the design of Etruria. In a letter to his partner concerning plans for the new buildings, Wedgwood wrote:

...these new hands should if possible be kept by themselves 'till we are better acquainted with them, otherwise they may do us a great deal of mischief if we should be obliged to part with them soon. I have had some thoughts of building steps to the outside of some of the Chambers for that purpose. What do you think of it? We cannot avoid taking in Strangers and shall be obliged sometimes to part with them again, we should therefore prevent as much as possible their taking any

part of the business with them. Every different class should if possible be kept by themselves, and have no connection with any other.¹¹³

Etruria was in fact built so that the various departments had individual entrances making it necessary to go outside to pass from one to the other. This was certainly unnecessary from the viewpoint of technical efficiency in building design. From the viewpoint of managerial advantage, it made a certain amount of sense to separate parts of the production process into different unconnected rooms with workers assigned to specific rooms. Wedgewood built his pottery and organized the work of his employees on the basis of the "need to know" concept. The work was physically divided up in such a way that they knew nothing more about the whole production process than what they needed to know to do their own small part of it. This may have been one of the first applications in the workplace of a concept that has since become the basis for the organizational structure of all international intelligence operations as well as an important fundament of modern business organization and management.

But this does not explain why Wedgewood felt it necessary to further restrict workers to the performance of one task among the several which might take place within each departmentalized workshop. He constantly complained that his "dilatatory, drunken, idle, worthless workmen" were not adequately skilled for his purposes. His double, and seemingly contradictory ambition was "to make such Machines of the Men as cannot err,"¹¹⁴ and "to make Artists...of...mere men."¹¹⁵ It would seem that his problem was one of underskilled workers. Shortly after the opening of Etruria, he wrote to Bentley:

...few hands can be got to paint flowers in the style we want them. I may add, nor any other work we do--We must make them. There is no other way. We have stepped forward beyond the other manufacturers and we must be content to train up hands to suit our purpose. Where amongst our Potters could I get a complete Vase-maker? Nay, I could not get a hand through the whole Pottery to make a Table plate without training them up for that purpose and you must be content to train up such painters as offer to you and not turn them adrift because they cannot immediately form their hands to our new stile, which if we consider what they have been doing all their life we ought not to expect from them. 116

Leaving aside the apparent improbability of not being able to find among potters one who could make a plate, we could suppose for a moment that a detail division of labor was needed in order that the workers develop the requisite proficiency. This was Wedgewood's view: "We are preparing some hands to work at red & black... (ware)... constantly & then we shall make them good, there is no such thing as making now & then a few of any article to have them tolerable."¹¹⁷

But this is not yet the whole story. We must take into account Wedgewood's attitude towards those who were already plainly and without doubt highly proficient, the famous artists of the day. Wedgewood found that there was no place for these people and their skill in his pottery. They corrupted the other workers. One had to be removed because "the hours he chose to work would, by example, have ruined ten times better men than himself."¹¹⁸ Another, "Tebo" (Thibault?), couldn't be tolerated because,

...he has done us very considerable mischief for our Modelers do less by one half than they did before, charging double prices for their work, & when talk'd to about it, have their reply ready that it is cheaper than Mr. Tebo's, & is finished, which his work never is. This will be a serious affair for me to manage, & bring back again without parting with any of them, which I do not wish to do."¹¹⁹

Eventually Wedgewood ceased to employ artists in their own right, and instead bought their designs at a safe distance. What was at stake here was his absolute prerogative to have things run exactly

as he wanted them. The independently competent and famous could not be made to submit to his authority, and in refusing to do so caused him more problems with the other workers than he already had. Concerning this matter, he wrote,

Oh! for a dozen good & humble modelers at Etruria for a couple of months. What creations, renovations, & generations should we make! Well - fair & softly, we must proceed with our own natural forces, for I will have no fine modelers here, though I seem to¹²⁰ wish for them, they would corrupt, & ruin us all.

Wedgewood's solution to this dilemma was to painstakingly instruct people of lesser stature to every task in a way which facilitated their obedience to his authority. Here we can see why, through the use of detail division of labor, there was from Wedgewood's point of view no contradiction between making "Artists...of...mere men" and "such Machines of the Men as cannot Err."

He did not of course accomplish this without some resistance from his workers. Potters regarded themselves as artisans and they were proud of their status. E. P. Thompson notes that "The Book of English Trades lists the apothecary, attorney, optician and statutory alongside the carpenter, currier, tailor and potter."¹²¹ They did not take kindly to the complete submission that Wedgewood demanded and to the decomposition and recombination of their work that he established. He had set himself to destroy their independence and their traditions. He demanded punctuality, setting up perhaps the first ever clocking-in system. Fixed hours, constant attendance at the task, and unyielding cleanliness were also required. He attempted to violate the sanctity of the wakes and fairs with their days of rest and entertainment. There

was a succession of revolts against this as well as against his attempts to reduce wages or hold them down. Although he was fierce in quelling these revolts, he never did succeed in wiping out the observance of the wakes and fairs. He went to elaborate lengths to extend his authority as far as possible in every aspect of his manufactory's organization, work and life.

From the foregoing descriptions of two famous examples of the early detail division of labour, it should be clear that the detail division of labour began to appear as a logical extension of capital's need to establish and extend real control over the labour process.

The detail division of labour also extends another important advantage to capital which Charles Babbage writing in 1832 was apparently one of the first to point out: that it cheapens the labour costs. In his own words,

...the master manufacturer, by dividing the work to be executed into different processes, each requiring different degrees of skill or of force, can purchase exactly that precise quantity of both which is necessary for each process; whereas, if the whole work were executed by one workman, that person must possess sufficient skill to perform the most difficult, and sufficient strength to execute the most laborious, of the operations into which the art is divided.¹²²

Babbage then follows Adam Smith's example by using the manufacture of pins to illustrate his observation. He explains that by dividing pin making into its several operations, and assigning each operation to one worker, each of whom is paid different rates according to a scheme based on the difficulty and skill involved in each operation, the cost of making pins is considerably cheapened from what it would be if several all around

pin makers were employed at rates reflecting their total abilities.

Although Babbage himself does not explicitly state it, it should be realized that the detail division of labour reduces labour costs not because it reduces the amount of labor necessary to produce a given item. It does not magically take less work to make a pin simply because that work has been reorganized. The advantage, clearly in this case for capital, is that the price of labour time itself is actually reduced. For example, women and children were hired at vastly reduced rates to perform some operations while men were retained at much higher rates for others.

The detail division of labour would not have been nearly so advantageous to capital if it did not also involve the practice of confining workers to one specific task in the process. One would have thought that if the chief value of the detail division of labour was merely the reduction in actual labour time necessary to produce a given item, it would not be of any further use to confine a worker to the ceaseless repetition of one operation. A worker could work at one thing for a time and then pass to another operation when fatigue and boredom called for some relief. This would involve the same principle of doing one operation continuously and separately from other operations. This principle of work organization does not require of itself, especially in a centralized workshop, that each worker should do only one thing constantly and forever. The creation of the detail worker (assigned to a single operation within the detail division of labour) can better be explained by the fact that it means workers do not have to be paid

according to a superfluous ability to turn out something akin to a finished product, but rather can be paid on the basis of ability to complete one simple task. That is obviously much less than what the whole operation or even several parts of the whole operation entails. Though this is clearly in the interests of capital, it is not so clearly in the interests of workers nor is it so clearly in the interest of pure technical efficiency.

The detail division of labour and the appearance of the detail worker in the early part of the Industrial Revolution was not, as is popularly believed, called into being by the simple technical necessities of machine production or increased efficiency. It was first a political and economic necessity of the growing capitalist control of economic activity.

The introduction of machinery proceeded to a larger degree than is ordinarily recognized as an aspect of the intensification of the detail division of labour rather than as a cause of the detail division of labour. But here we cannot take an absolute and simplified view of the matter. We can say that in general the kind of machinery that appeared presupposed the existence of a detail division of labor and the accompanying kind of discipline and control of the labor process that we have seen. Since they presupposed the existence of a detail division of labor, when they were introduced they imposed the necessity of it if it did not already exist in a given time and industry. In this sense, it could be said that machinery caused the detail division of labor. But this of course misses the point that the detail division of

labour had already been put into practice, not universally but in those industries which were the most economically dynamic and significant, because of its own advantages to the capitalist. To say that machinery caused the detail division of labour requires a narrow interpretation which misrepresents reality because it abstracts the context away.

In any case, the concept of causality is out of place when trying to interpret the role of machinery in the development of the modern organization of work. It was said in Chapter Three that the organization of work was composed of two interdependent elements: the division of labour and technology. The particular form of the division of labour and of the machinery that is made use of in conjunction with that division of labour do not stand in a causal relationship with each other. They are two parts of a whole and do not have a separate history. The mutual changes they may undergo are guided by more profound changes in the structure of society itself, and the changes in the two parts are linked to each other. Thus it is just as valid to say that the detail division of labour "caused" machinery by making machinery possible as it is to say that it was the possibility of machinery that "caused" the detail division of labour. This is as true now as it was during the Industrial Revolution in England. The process of increasing the application of machinery and intensifying the detail division of labour which began during the Industrial Revolution has been a continuous one down to the present day, so that successive generation of workers have been subjected to it. Each new advance in the detail division of labour opens up the possibility of further applications of machinery, which

results in even more intensification of the detail division of labour, and so on. Today, even white collar workers are not exempt from that self-perpetuating cycle. Much of the work that secretaries do is routine detail work. The nature of that work has made possible the innovation of sophisticated word processing equipment that will in turn intensify further the routine detail nature of secretarial work.

The next section of Chapter Four is concerned with the specific role of machinery in the changes in the organization of work that took place during the Industrial Revolution in England.

Innovation: The Introduction of Machinery

The struggle is not so much against machinery as against the power behind machinery, the power of capital.¹²³

It was argued in Chapter Three that all productive technique bears the marks of the form of social organization which is its prerequisite, and that technology conceived of as a collection of things does not provide a sufficient explanation of the organization of work in any given social formation. In this section we see how that applies to the innovation and introduction of machinery during England's Industrial Revolution.

The previous sections of this chapter have sought to describe and interpret the early manifestations of the modern capitalist organization of work in the context of the historical social formation. In particular, it was seen that three major aspects of the early capitalist

organization of work, i.e. the centralized workplace, a rather rigid discipline enunciated and enforced by the owner or his representative, and a minute division of labor performed by specialized detail workers under the direction of the owner, were to a large extent related to the owner's need to establish and extend control over the labor process. It was also shown that machinery, or what is narrowly conceived of as technology, played no pivotal part in the appearance of those three aspects of the early modern division of labor. In fact, most industries were not fully mechanized until well into the nineteenth century, long after the essential features of the early capitalist organization of work had been established.

Machinery is only one side of the organization of work, of which the division of labor is the other half. Just as the actual form taken by the social division of labor is related to the dynamics of the larger social formation in which it is contained, so too is the form that machinery took and the ways in which it was implemented and used related to the larger social formation.

The entire Industrial Revolution was the logical consequence of capitalism coming into its own as a method of organizing society's economic activities. Any interpretation of the Industrial Revolution which fails to recognize the centrality of that occurrence will have missed its major significance. There is a high level of agreement among historians on this point.

If the Industrial Revolution meant the rise of capitalism as a

method of economic activity, it also meant the rise of the working class. Relations between the owners of industry and their workers were not then harmonious just as they are not now harmonious. And it would not be unreasonable to add that relations in that period of great social transformation and upheaval were considerably less harmonious than they have been much of the time since then. On occasion this conflict escalated to become an outright battle. At other times it was not so strongly delineated. It was a battle about control of the labor process, but it was also about much more. From the working peoples' point of view it was about the destruction of home life and of traditions, about having enough to eat, about degradation of the craftsman's independence and dignity. From capital's point of view, it was about economic survival in the face of stiff competition, about the rights of property, about exerting their ascendent power in society and the economy.

It is within the context of the consolidation of capitalism as a method of economic activity together with the rise of the working class that the reorganization of work, including the introduction of machines and machine production as well as the new division of labor, must be understood. The application of machinery to production was a process that responded to a multitude of factors both economic and political.

This section looks at some of the ways that the application of machinery responded to the political exigencies of the conflict between labor and capital. The development and introduction of machinery was part of the battle between labor and capital and proceeded according to

the vicissitudes of that battle rather than according to an independent logic of technological progress of constantly improving efficiency. Machinery was not uncommonly used directly as a weapon in the conflict as a lever to adjust the relationship between capital and labor. In the first part of this section we look at some of the ways that capital used machinery as a weapon against labor and why. In the second part we look at some of the ways that labor used machinery as a weapon against capital.

The first appearance of some machines was due to the conscious and explicit desire of employers to be freed of dependence on a workforce that was often unwilling, intractable and rebellious. We can find numerous examples of a particular piece of machinery coming into use as a result of a strike or some other form of uprising by a group of workers. Marx observed in this connection that machinery "is the most powerful weapon for repressing strikes, those periodical revolts of the working-class against the autocracy of capital."¹²⁴ The ultimate simplicity of its effectiveness was that it could make redundant the workers who were attempting to extract concessions from the owners.

We have written record that the manufacturers of the day and their allies were not unaware of the advantage offered to them by the use of machinery. Earl Fitzwilliam, Lord Lieutenant of the West Riding of Yorkshire (a center of the wool trade) who was later to be known for his humanity in dealing with the Luddites and who was still later to be dismissed from office for protesting over the notorious massacre of weavers at Peterloo, urged in 1802 that the wool croppers (a skilled and elite group of wool workers about whom we will hear more later) should be

replaced by machinery so that "their consequence would be lost, their Banks would waste, their combinations would fall to the ground, and we should hear no more of meetings of any sort of description."¹²⁵ This is in fact what happened to them after a protracted battle of twenty years' duration. The Manchester Commercial Advertiser in the midst of the Luddite raids of the hand loom weavers devoted an article to explaining how the power loom would save the cotton masters from the dissipation and human folly of those weavers.¹²⁶ William Fairbairn, who invented a riveting machine as a result of a strike by boiler makers in his Manchester business in the late 1830's wrote that "the introduction of new machinery and the self-acting principle owed much of their efficacy and ingenuity to the system of strikes."¹²⁷

The usefulness of machinery in this regard did not escape the notice of Andrew Ure, the arch apologist of the factory system. He gives us several examples in The Philosophy of Manufactures of machines that were designed specifically for the purpose of undermining workers' initiatives to exert or maintain some kind of control over their wages and working conditions.

He mentions a power loom weaving factory in Manchester at which there was a strike by the yarn dressers. As a result of this strike, the owner installed a machine which was so simple that it enabled him to employ "free labourers" rather than "monopolists" (skilled workers) to do the work. Ure comments,

Thus the combined mal-contented who fancied themselves impregnably intrenched behind the old lines of the division of labour, found their flanks turned and their

defences rendered useless by the new mechanical tactics, and were obliged to surrender at discretion.¹²⁸

Judging by his use of military terminology, there is no doubt in Ure's mind that the conflict was a battle of some kind.

He finds another example in the printing of calico. According to Ure, the workers in this branch of the trade were ruling their masters "in the spirit of the Egyptian task-masters" by enforcing their conceptions concerning the number of apprentices to be employed (apprenticeship by this time, rather than being a procedure for teaching the mysteries of a craft, was used by the masters to hire cheap young unskilled labour), the hours of work, and the wages to be paid. Faced with this intolerable situation, the owners turned to science and were duly reinstated in their rightful place, "that of the head over the inferior members", by the development of a machine for printing calico. Ure says that the machinery for dyeing and rinsing calico was also devised "under the high pressure of the same despotic confederacies".¹²⁹

Apparently the enlargement of the mechanical spinning frame, by which one man was enabled to do the work of two, was also the result of what the owners viewed as unconscionable transgressions of their workers. These workers had managed to establish some kind of control over the entry of new unskilled people into the trade, thereby in Ure's view having "set themselves in hostile array against capital, boasting their power to constrain it to their will". The masters after many attempts found it impossible to reduce the rates of pay. Finding it impossible to reduce the price they paid for labor, they resorted to an approach

which reduced the amount of labor they needed to use. This they did by enlarging the size of the spinning frames. Ure writes of that event:

In doubling the size of his mule [the name given to the spinning machines], the owner is enabled to get rid of indifferent or restive spinners, and to become once more master of his mill, which is no small advantage. I am well assured, that but for the extravagant pretensions of the ruling committee [the organization of the spinners], this catastrophe would not have befallen the operatives for many a day to come...¹³⁰

The invention of the fully automatic spinning mule for the spinning of cotton thread is one of the better known examples of a machine being developed as a weapon to be used against workers. In Ure's telling of the story, the cotton spinners had participated in a series of strikes "wantonly inflicted upon one set of mill-owners after another throughout the several districts of Lancashire and Lanarkshire, for the purpose of degrading them into a state of servitude." Although Ure does not mention it, these strikes were probably the result of a general agreement among the owners to impose a wage reduction. In response, the owners banded together and contracted with a machining firm to have it invent a completely self-acting spinning mule. In a few months the firm fulfilled its obligation by producing a machine which had "the thought, feeling, and tact of the experienced workman-which even in its infancy displayed a new principle of regulation, ready in its mature state to fulfil the functions of a finished spinner...even long before it left its cradle, it strangled the Hydra of misrule." The spinners called this new machine

the Iron Man. Ure tells us that this invention "confirms the great doctrine already propounded, that when capital enlists science in her service, the refractory hand of labour will always be taught docility."¹³¹

In Ure's mind, these few inventions described above are not isolated chance occurrences of machinery being used to subvert the aspirations of the laboring poor, but rather demonstrate a general principle of mechanical innovation, and of the factory system itself, which is the replacement of skilled labor by machinery: "...whenever a process requires peculiar dexterity and steadiness of hand, it is withdrawn as soon as possible from the cunning workman, who is prone to irregularities of many kinds, and it is placed in charge of a peculiar mechanism, so self-regulating that a child may attend it."¹³² He informs us what he means by at least one of these "irregularities of many kinds":

By the infirmity of human nature it happens, that the more skilful the workman, the more self-willed and intractable he is apt to become, and, of course, the less fit a component of a mechanical system, in which, by occasional irregularities, he may do great damage to the whole. The grand object therefore of the modern manufacturer is, through the union of capital and science, to reduce the task of his workpeople to the exercise of vigilance and dexterity, --faculties, when concentrated to one process, speedily brought to perfection in the young.¹³³

A bit of historical explanation may be necessary to explain why it should have been felt that skilled workers were more insubordinate than others. Through tradition dating from the days of guilds and paternalist legislation which granted exclusive rights and guardianship of a trade to its workers, almost every class of skilled workers had some kind of control, at this point more from custom than law, over

their working conditions. This control ranged from the pacing of the weekly work cycle through to regulating the entry to and length of apprenticeships, which was the only legitimate way that new people could enter the trade as long as the workers had anything to say about it. They also had a certain amount of pride in their craft, and were accustomed to seeing themselves as a group with common interests and problems, and with common solutions to those problems.

These traditions and self-conceptions made it relatively easy for them to seek ways of collectively refusing to allow the increasingly powerful owners to impose their absolute authority over work and production. There are countless stories of skilled workers impeding in one way or another the owners' exercising a free reign over the operation of the production side of their business. In many cases the skilled workers based their claims explicitly on old half-forgotten pieces of paternalist legislation which gave them rights incompatible with the new spirit of laissez faire capitalism, such as the right to limit the number of apprentices used by the masters and the right to regulate the quality of goods produced. In fact, when the first outbreaks of Luddism appeared among the framework knitters (to which we will later return), they claimed a right to destroy the knitting machines on the basis of an old Charter granted to the Framework Knitters Company by Charles II which gave them the power to appoint deputies to inspect goods and destroy those which were inferior. As late as 1773 the Spittlefields silk weavers had obtained an Act which provided for the regulation of their wages by the Lord Mayor in London and by the magistrates in other places. This

success provided encouragement to the skilled workers in other trades who spent many years and large sums of money trying to obtain similar acts to apply to their own trade. The masters spent as many years and an equally large, if not larger, sum of money in opposing any such acts. The legal pleadings of the workers alternated throughout the next forty years with periodic outbursts of rioting and machine breaking, but they were none of them successful after the silk weavers. All the major episodes of Luddism in the years 1811 and 1812 were preceded by unsuccessful attempts to win protective legislation from Parliament.

It was this long history of increasingly more determined and organized collective attempts by skilled workers to limit the autonomy of the masters that engendered their feeling that skilled labor was something with which they did not wish to associate. As we saw above, they used the application of machinery to the work carried on in their mills and workshops as one way to free themselves from the onerous effects of having to rely on skilled labor. However, this was not the only tactic they employed; they were just as forceful in lobbying against any kind of protective legislation as the workers were in lobbying for it. And by and large they were much more successful because the spirit of the nineteenth century was ever more solidly embodying the economic precepts of people like Adam Smith who advocated that the government regulated best when it regulated least.

Those who replaced the skilled workers were to a great extent women and children who were regarded as a more tractable labor force,

and who most certainly constituted a cheaper labor force. The skilled men saw their replacement by female and child labor as an intentional act on the part of their employers. When the worsted hand loom weavers drew up a list of grievances in 1835, they protested against "...the adaption of machines, in every improvement, to children, and youth, and women, to the exclusion of those who ought to labour--the MEN."¹³⁴

Although the increasingly widespread use of machinery did not initially cause the centralization of work into an employer controlled location, it would be fair to say that it accelerated that trend. Whether it was the women and children going into the mills and replacing the skilled men, or whether it was the male artisans being forced to follow machines with which they could not compete into the factories, the use of machinery further reinforced the erosion of the working class pattern of family life by breaking up the practice of domestic labor. We have seen how this was resented by the laboring poor.

A very significant result of increasing mechanization was the fact of ownership itself. This is well expressed in a comment made by the cotton spinners of Lancashire in a submission to Parliament in the late 1770's against the use of the water frame (an early spinning machine first used in Arkwright's mills which prompted a violent and destructive response on the part of the spinners). They said that "the Jenneys are in the Hands of the Poor and the Patent Machines are generally in the Hands of the Rich."¹³⁵ Whereas before the advent of machinery, the tools of the trade were frequently, though by no means universally, in the possession of those who worked with them, after the appearance of machinery,

it was less and less the case that the means of production were in the possession of the workers. By the nature of the inventive process and the high cost of the finished machine, they ended by being the property of someone other than the workers. Hand looms in general belonged to the weavers, power looms always belonged to the masters. And so on throughout the trades as they were mechanized.

The combination of the destruction of skill and the removal of the instruments of labor from the ownership of the workers and artisans proved to be an unfortunate one from their point of view. The following description of the invention of the Jacquard loom clearly shows why:

...the special feature of this invention is that, whereas in ordinary looms the various intricate arrangements of the threads to form a particular pattern are effected by the worker himself, sometimes by special preparation of the loom, and sometimes by precise adjustments during the work; on the new machine, thanks to a simple and ingenious mechanism, they take place automatically without any interference by the workers. The weaver's work clearly became much more mechanical. The intelligence which he had to apply before in order to transfer the pattern on to the loom had passed now, to a certain extent, over to the machine; and the benefit which the worker used to derive from his use of his intelligence was now lost to him, and rested with the owner of the machine, the commercial employer. As a result, the worker suffered a double disadvantage: first, he could now use, and therefore realize, only his mechanical powers and skill; and secondly, he was in no position to provide himself with a similar but much more expensive Jacquard loom: he was no longer his own independent master, but could only pursue his occupation in the service and pay of a "foreign" master. 136

One of the responses of workers and artisans to this "double disadvantage" was the destruction of the offending machinery. It is to this that we now turn.

Immediately Luddism comes to mind, with images of unruly backward-looking gangs roaming the countryside and terrorizing peace loving citizens with their futile attempts to stop progress. But Luddism was only a short period in the history of machine breaking during the Industrial Revolution in England, and it was neither the beginning nor the end of this mode of industrial strife. Luddism must be seen in the context of the longer history of machine breaking, and machine breaking must be seen in the context of the social, economic and political transformations taking place at the time. Seen in this context, the history of machine breaking is largely the history of labor using machinery as a weapon against capital.

Hobsbawm reduces the "industrial" concerns of the work people during the tumultuous time of the Industrial Revolution to two: "preventing unemployment and maintaining the customary standard of life, which included non-monetary factors such as freedom and dignity, as well as wages."¹³⁷ Workers and artisans had been involved in defensive actions around these concerns for quite a long time, actions ranging from food riots to direct confrontations with employers. A time honored method of putting pressure on the masters was to destroy their property, including raw materials put out to domestic workers, finished goods, tools, and even private property such as houses and farms belonging to the masters. Machine breaking was initially part of this "collective bargaining by riot". Hobsbawm characterizes it as "simply a technique of trade unionism in the period before, and during the early phases of, the Industrial Revolution."¹³⁸ This is of course not strictly speaking

true, since there were no trade unions as we know them, but the notion that machine breaking was a traditional technique for encouraging employers to see things the workers way, rather than an expression of a consistent and abiding hatred for all machinery, is born out by a considerable amount of evidence.

To give only a few examples of labor's use of machinery as a tactical weapon against capital in the eighteenth century: in 1710 the London framework knitters, angered by the employment of too many parish "apprentices" (cheap unskilled labor provided by abandoned, orphaned or otherwise impoverished children), wrecked one hundred knitting frames in protest.¹³⁹ In Melksham in the late 1730's the textile workers cut the chains in all the looms belonging to a certain employer who had attempted to institute a reduction in the price for finished work.¹⁴⁰ In the Northumberland coal district the miners burned and smashed pit head machinery during riots in the 1740's and again in 1765. For their efforts they won in the first instance a wage increase and in the second the right to choose their employer when the annual contract expired.¹⁴¹ The Nottingham framework knitters, after having been twice defeated in the late 1770's in their efforts to get Parliament to enact a law regulating their wages and the practices of the knitting trade, disposed of three hundred knitting frames belonging to a Mr. Need, the strongest lobbyist against the bill, and others. This so impressed the masters that they agreed to raise the men's wages if they would stop the destruction. This agreement on prices, and a subsequent one reached a few years later, remained in effect for about the next thirty years.¹⁴²

Collective bargaining by riot featuring the destruction of machinery was not without its successes. It was, in fact, on more than one occasion more effective than petitions to Parliament.

In addition to this pattern of machine breaking as part of collective bargaining by riot to win industrial objectives not connected to the fact of the machine itself, there was increasingly in the second half of the eighteenth century a pattern of hostility to machinery itself. This hostility was usually generated by a fear of the unemployment attendant upon the use of the machinery. The hostility expressed itself through both constitutional and violent channels. It was concerned both with unemployment stemming from the elimination of work due to the machine doing the work of more than one man, and with unemployment arising from the replacement of the skilled artisan by the unskilled laborer, or "apprentice" as they were somewhat anachronistically called.

One of the most famous campaigns of this type was in Lancashire in 1779 when several thousand cotton spinners and their supporters destroyed all the water frames (early spinning machines) in Arkwright's mill and then burned the place down for good measure. This was followed by an encore at a mill belonging to a Mr. Peel. The spinners explained these actions the following spring in a petition to Parliament that called the introduction of the new machines "a Domestic Evil of a very great magnitude" which threatened them with total loss of employment.¹⁴³ However, the spinners' fears of massive unemployment soon gave way with the dramatic increase in trade that mitigated the effects of the new machinery. Other groups of workers were not so fortunate.

Many groups of skilled workers voiced similar fears. The wool combers in their 1794 petition to Parliament against Cartwright's combing machine said

...by the invention and practice of a new machine for combing wool, which diminishes labour to an alarming degree, the petitioners entertain serious and just fears that themselves and families will speedily become a useless and heavy burthen to the State. It appears to the petitioners that one machine only, with the assistance of one person and four or five children, will perform as much labour as thirty men in the customary manual manner...and it is with the most heartfelt sorrow and anguish the petitioners anticipate that fast approaching period of consummate wretchedness and poverty, when fifty thousand of the petitioners, together with their distressed families...will be inevitably compelled to seek relief from their several parishes.¹⁴⁴

The hand loom weavers, who rarely resorted to machine wrecking when the power loom began to make their labor unviable, advocated three proposals with respect to the use of the power looms: first, that the looms should be taxed so their labour would be more competitive (and that the tax could be used for the relief of the distressed weavers); second, that the hours of work be restricted so that the work would be more evenly distributed among the weavers, (also reducing the working day for the benefit of those employed), and third, that the power loom weavers be adult males.¹⁴⁵

The struggle of the wool croppers against the gig mill, which stretched from the time of Edward VI (1547-53) through to one of the more colorful episodes of Luddism, was based on the well founded fear that that machine would make them "into an order of men not necessary to the trade".¹⁴⁶

This was exactly their fate, though they succeeded in postponing it for a generation or two.

A third pattern of machine wrecking was generated by a hostility not so much to the machine itself as to the way it was used. The Lancashire spinners' riot of 1779 mentioned above, for example, extended beyond the destruction of the mills using water frames to the systematic destruction of all spinning jennies (an earlier spinning invention of the same principle as hand spinning but which had more than one spindle) with more than 20 spindles. (The jenny simply multiplied human hands, while the water frame was a substitute for human skill.)¹⁴⁷ By limiting their wrath to only those jennies with more than 20 spindles, the spinners were making a distinction between those jennies which were too large to be used in domestic manufacture and those that could be used in cottage industry which they considered "a fair machine" since it did not have to be in the hands of a capitalist.¹⁴⁸ They also destroyed several other types of machines such as carding, twisting and roving machines, which had been gathered into central locations and did work which had previously been done by hand. They apparently had wide ranging support - those arrested for participation included weavers, spinsters, colliers, nailmakers, labourers, joiners, and even a cottage tradesman.¹⁴⁹ It seems clear that in part they were angered by the "foreign" ownership of the machines, and by their being set up in factories rather than the spinners' cottages.

The Luddite uprisings among the framework knitters can be seen to some extent as part of the pattern of hostility against machines for the way they were used. When the Nottingham knitters embarked on their career of Luddism, it was not out of anger at any new machinery,

but rather at an adaption of previously existing machinery to make a new kind of product which, in addition to being cheaper, was widely considered to be inferior. Of course this fact alone explains nothing. It acquires its meaning and assumes its role as a cause of Luddism only when interpreted in the context of the relations of production in existence at the time. Just as a single fact such as that means nothing on its own, neither does the fact of a particular machine mean anything on its own, then as now. Neither machinery nor any other technology has a history of its own. Its history is subsumed in the history of the organization of work which in turn can only be understood as part of a larger history. It is on the basis of this understanding that the causes, ambitions and meaning of Luddism should be seen.

There were three main Luddite uprisings in three parts of England among three different groups of workers: in Yorkshire among the wool croppers, in Nottingham among the framework knitters, and in Lancashire among the cotton weavers. These movements, though frequently misunderstood, have been reasonably well studied and documented.¹⁵⁰ Their stories are repeated here in the hope of illuminating the meaning of machinery as part of the new capitalist organization of work seen in the context of the changing social relations of the time. For the purposes of brevity, the story of the Lancashire Luddites has been eliminated.

By the time the Luddite disturbances appeared among the framework knitters, their trade was still not a factory industry. It was controlled by merchant hosiers who had their goods made by the knitters, or stockings as they were also known, working in their own homes or in a

small workshop. The knitting frames that they used (which were a much earlier invention) were more expensive than the hand looms of the weavers, and not many of them were actually owned by the stockingers. Instead they were increasingly the property of the merchant hosiers who rented them out to the knitters. Frame rents were a constant source of irritation to the stockingers because they were subject to being raised by the more avaricious of the hosiers. Raising frame rents had the same effect as lowering wages. We have already seen how in 1779 after suffering Parliamentary defeat in their attempts to win regulated improvements in the trade, the framework knitters went on a fairly successful campaign of frame destruction, winning for their efforts a more or less fixed and uniform wage rate. By 1810 the knitters looked back on the years from roughly 1785 to 1805 as the golden age of the trade when work was plentiful and wages livable. Then conditions began to worsen. Changes in fashion had led to some amount of unemployment. Moreover, markets were disappearing on the Continent and in the U.S. because of war conditions. Wages had fallen by about one third. In some villages the truck system, or payment in kind, had almost completely replaced wages.

It was about this time that the owners of wide frames, which had previously been used to make articles that were now out of fashion, began to use them to make inferior goods known as "cut-ups". Cutting up was a practice whereby stockings and other goods were cut from wide pieces of knitted fabric and sewn together, producing an article that did not have proper selvages as did the stockings made in a "tradesman-like" manner, and were thus prone to falling apart with rapidity. They

were cheap and could be mass produced. For more than one reason they were profoundly disliked by the stockings. They undermined the market for properly made goods. They discredited the good name of the trade because they were of inferior quality, and this was important to the stockings who did not want their trade to become "dishonourable". And cutting up led to the even more odious practice of "colting" - the use of unskilled labor or too many apprentices, which amounted to the same thing.

Even if it had not already been realized, the connection between the cut ups and the deteriorating standard of living of the knitters was made quite clear in 1809 when a group of hosiers announced their agreement among themselves to reduce the knitters' wages unless they (the knitters) could enforce the suppression of cut up work. The knitters tried by various legal means to accomplish this, but failed. It was in the aftermath of this failure that Luddism first appeared.

The activities of the Nottingham Luddites were well planned and organized, and highly selective. A song of the time, entitled "General Ludd's Triumph", speaks their intentions:

The guilty may fear but no vengeance he aims
 At the honest man's life or Estate,
 His wrath is entirely confined to wide frames
 And to those who old prices abate,

 Let the wise and the great lend their aid and advice
 Nor e'er their assistance withdraw
 Till full-fashioned work at the old fashioned price
 Is established by custom and law.
 Then the trade when this arduous contest is o'er
 Shall raise in full splendour its head,
 And colting and cutting and squaring no more
 Shall deprive the honest workmen of bread.¹⁵¹

With a few exceptions that were apparently mistakes, the Luddites stuck to their policy of destroying only those frames which were being used in an offensive way. In addition to disposing of frames making cut ups and working under what they considered a fair price, they also did away with those frames that were being used by "colts". The Luddites moved at night in small armed disciplined bands from village to village. A letter from an observer describes their methods:

...two men came to this place who called themselves inspectors from the committee; they went to every stockinger's house and discharged them from working under such prices as they gave them a list of, and said they should come again in a few days, and in case any of them were found working without having a ticket from their Master saying that he was willing to give the prices stated in their list--They should break there frames. They summoned all the stockingers about twelve or fourteen in number of Master Men to a Publick House, with as much consequence as if they had a mandate from the Prince Regent. When they got thither all I can learn at present, was for the purpose of collecting money from them for the support of those families, who were deprived of getting their bread by having their frames broken.--Where they found a frame worked by a person who had not served a regular apprenticeship, or by a Woman, they discharged them from working, and if they promised to do so, they stuck a paper upon the frame with these words written upon it: "Let this frame stand, the colts removed."¹⁵²

In some areas the hosiers began to label the frames belonging to them with a notice that read: "This frame is making full fashioned work, at the full price".

Although a few thousand troops had been posted in the area, it was not possible to protect the offending frames. The Luddites had popular sympathy on their side, and the knitters who used the frames were

not overly interested in defending their master's property. Some of the masters who did not like the cut ups also sympathized with the Luddites. When the first phase of Nottingham Luddism came to an end in early 1812, some one thousand frames had been destroyed and the knitters had succeeded in raising their wages for a time. Thereafter until 1817 the knitters combined legal activities for the purposes of petitioning Parliament to redress their other grievances with further sporadic outbursts of machine breaking. But the results of the 1811-12 machine breaking were their last victory, and they were soon reduced to a general state of impoverishment and starvation.¹⁵³

The central issue in response to which the Nottingham Luddite campaign arose was the attempt by the hosiers to cheapen their costs at the expense of the workers through various methods such as colting, lowering wages, making cut ups, payment in truck, increasing frame rents, etc. There were unquestionably no new machines involved. It was rather the manner in which the old machines were put to new uses, as well as other initiatives by the hosiers not related directly to machinery, to which the knitters objected. Machinery was destroyed in an attempt to force the masters to desist from the several injurious practices in which they were engaged, practices that were undermining their economic security and degrading the honor of the trade. In this sense, Nottingham Luddism was part of the tradition of collective bargaining by riot, if their systematic and orderly campaign can be called a riot.

The central issue of Yorkshire Luddism was different. Here the primary objection was to a machine which was to a great extent replacing

the workers. The machines were the shearing frame and the gig mill, and the workers were the wool croppers. But the meaning of Yorkshire Luddism goes far beyond specific grievances against certain machines, for it was part of a much more generalized and long standing fight of the entire body of wool workers against the effects of the new methods of organizing production and against the increasing power of those who were gaining control of production. In fact, Yorkshire Luddism soon evolved from the destruction of certain machines into some kind of generally revolutionary conspiracy.

The wool croppers, or shearmen as they were sometimes known, were the elite of the wool workers. These highly skilled men finished the cloth through a complex process involving many steps that were traditionally done by hand. It was said that "they can make a piece 20 pr. Cent better or worse by due care and labour or the reverse." Their wages were high, customarily set at 5% of the value of the finished cloth. Traditionally the unfinished cloth was bought by merchants from small clothiers and put out to be finished in small workshops employing five or six people. By the end of the eighteenth century, some of the larger manufacturers had finishing done on their own premises. Samuel Gott, one of the largest, had up to eighty croppers working in his establishment.

The comfortable position of the croppers was threatened by two machines, the gig mill and the shearing frame, which replaced the need for their skilled labor in two important steps in the finishing process. Presumably it was of these two machines that Lord Fitzwilliam spoke when

he said that the croppers should be replaced by machinery so that "we should hear no more of meetings of any sort of description." The gig mill as noted earlier was an old invention dating from the mid-sixteenth century. Although the croppers' long fight against the gig mill had at one point resulted in its being outlawed, there was an increasing number of them scattered about the wool district countryside by the end of the eighteenth century. The Yorkshire croppers were determined to prevent its introduction into Leeds. In this they succeeded through strong organization to the extent that as late as 1814 the Leeds manufacturers were afraid to bring in the gig mills.

But this was only one town. The croppers decided to petition Parliament to enforce an old statute banning the use of gig mills. They also lobbied for the enforcement of two other old laws: the enforcement of the Elizabethan statute requiring a seven year apprenticeship for weavers and other cloth workers, and an early statute which limited the number of looms that could be owned by any one person. In this legal enterprise they were joined by the weavers, and also by many small clothiers, all of whom were united by some sense that what was at issue was the power of the big manufacturers to take over the trade and tear apart the traditional relations of production. For clearly their concentration of looms and workers into large workshops, and their use of improperly apprenticed workers, contrary to the old statutes which had fallen into disuse, was a threat to the position and power of weavers, croppers, and small clothiers alike. For this reason, the fight of the croppers against the gig mills, which was

also a fight against the power of the big capitalists in content if not in form, expanded into a much larger conflict.

Their attendance upon Parliament, begun in 1802 and carried on by an organization of croppers known as 'the Institution', dragged on for several years at heavy expense to the workers. The Institution claimed to have nearly all the croppers in Yorkshire as members, as well as a large number of weavers and small masters. Their challenge to the unrestrained growth and power of the large capitalists was widely supported by many other kinds of skilled workers and artisans. The Institution had received either money or membership from "colliers, bricklayers, woolsorters, clothiers, joiners, sawyers, flax-dressers, shoemakers, turnpike-men, cabinet-makers, pattern-ring-makers, and papermakers". The Parliamentary Committee investigating the petition reported that "they [the petitioners] frankly allow that they wish to retain this Law [on apprenticeship] on account of its tending to embarrass the carrying on of the Factory system, and thereby to counteract its growth."¹⁵⁴

The Committee regarded the wool workers with the utmost suspicion, saw dark plots in the fact that they had been able to join together in raising the money to sustain the high costs of attending Parliament, and threatened them with prosecution under the recently enacted Combination Acts which made any collective efforts on the part of the workmen (and theoretically the masters as well) illegal. One of the witnesses, when closely questioned about his connections with any organized groups of workers, answered that he belonged to "An Association, to subscribe

our Mites to bring before the Honourable House of Commons. To bring what? Our Case that we might not be sent to the Factories."¹⁵⁵

Parliament, after a delay of several years, had by 1809 abrogated every law that the wool workers had hoped might offer them some protection. Some of the larger employers raced with each other to capture what was left of the market in those war distressed years by installing gig mills and shearing frames, thereby availing themselves of the use of the consequently cheaper labour. This was the signal for the beginning of Yorkshire Luddism:

We will never lay down Arms [till] The House of Commons passes an Act to put down all Machinery hurtful to Commonality, and repeal that to hang Frame Breakers. But We. We petition no more --that won't do -- fighting must.

Signed by the General of the Army of Redressers

Ned Ludd, Clerk 156
Redressers for ever Amen.

By the time their frustrations with legal methods of recourse gave way to Luddism, gig mills had come into more or less general use except in Leeds itself. Yorkshire Luddism was more concerned with shearing frames which had not come into such widespread use. In the beginning their attacks equalled those of the Nottingham Luddites in organization and thoroughness. They sent letters to the owners of the frames warning them to stop using them if they didn't want their frames and premises destroyed. If the owner didn't comply, they descended upon his premises at night in two groups, one to keep watch while the other did the job. After one such attack, according to a Leeds newspaper,

As soon as the work of destruction was completed, the Leader draw up his men, called over the roll, each man answering to a particular number instead of his name; they then fired off their pistols... gave shout, and marched off in regular military order.¹⁵⁷

Within six weeks of the first attacks, most of the smaller masters who had installed shearing frames had taken their machines down. Faced with general public hostility, the apparent helplessness of the military and the successes of the Luddite bands, their determination failed them when they received letters such as the following:

Information has just been given that you are a holder of those detestable Shearing Frames, and I was desired by my Men to write to you and give you fair Warning to pull them down...You will take note that if they are not taken down by the end of next week, I will detach one of my Lieutenants with at least 300 Men to destroy them and furthermore take Notice that if you give us the Trouble of coming so far we will increase your misfortune by burning your Buildings to Ashes and if you have the Impudence to fire upon any of my Men, they have orders to murder you, & burn all your Housing, you will have the Goodness to your Neighbours to inform them that the same fate awaits them if their Frames are not speedily taken down...¹⁵⁸

After less than two months of activity, little remained for the Luddites to do except mount an attack on the few large mills that still used the disputed machines. The first attack by a crowd of between 300 and 600 on an "extensive" cloth manufactory near Wakefield was a success. Their next attempt was on the Rawfolds Mill of Mr. Cartwright, one of the biggest wool manufacturers. The attack was expected and the mill was defended. The attackers left in defeat without destroying any machinery. The affray resulted in the death of two of the Luddites who, after being left behind wounded, were refused aid by Cartwright because

they declined to inform on their companions. This was the first blood shed in the entire Luddite affair. Following this, Yorkshire Luddism ceased to consist of attacks on machinery and became characterized by more generally subversive and revolutionary aims, giving way to well organized raids for arms and money. It later faded away in a climate of arrests, threats and betrayals, as well as a reversion to pursuing avenues of legal recourse and more pacific trade union type organization and activities.

Yorkshire Luddism was not a question of a blind unthinking opposition to machinery. In fact, shortly after the turn of the century there were proposals made by the wool workers for the gradual introduction of the machines with provision for finding other employment for those who would thereby lose their jobs, or for a tax on cloth finished by the machines for the relief of the unemployed looking for work. These proposals came to naught. The croppers from their point of view had quite logical fears about the meaning of gig mills and shearing frames, and these fears were justified. Their trade was soon eliminated:

Between 1806 and 1817 the number of gig mills in Yorkshire was said to have increased from 5 to 72; the number of shears worked by machinery from 100 to 1,462; and out of 3,378 shearmen no less than 1,170 were out of work while 1,445 were only partly employed.¹⁵⁹

In total defeat they tried to get the government, since it would not stop their replacement by machinery, to help them emigrate. This too was refused, and as the Hammonds wrote, they "were left to starve as best they could".

Although Yorkshire Luddism was specifically directed against the use of shearing frames and gig mills, it was the result of and founded upon a much more general unrest concerning the unrestrained ascendancy of industrializing capitalism trampling underfoot the traditional relations and methods of production and the ways of life that they were part of. According to Malcolm Thomis:

...part of the resentment of the Yorkshire Luddites arose from the fact that manufacturers were not only operating shearing-frames and gig-mills but also gathering them together in large numbers and housing them in factories, alongside other processes in cloth-production from which they had traditionally been kept separate.¹⁶⁰

We have already seen how the legal battle against the gig mill immediately generalized itself into an expression of opposition to the factory system by a very diverse part of the population. It was in part a widespread and deeply felt moral outrage against the industrial capitalists that allowed Luddism to win what victories it did at a time when there were 12,000 troops in the area, a greater number than General Wellington, who later defeated Napoleon, had under his command. It was a sense of outrage at a system which the working people felt violated the honor of craftsmanship, the control of workers over their trade, and the right of people to earn a decent living. "What was at issue," according to Thompson,

was the 'freedom' of the capitalist to destroy the customs of the trade, whether by new machinery, by the factory-system, or by unrestricted competition, beating-down wages, undercutting his rivals, and undermining the standards of craftsmanship.¹⁶¹

Marx criticized Luddism and machine breaking in general:

It took both time and experience before the work-people learnt to distinguish between machinery and its employment by capital, and to direct their attacks, not against the material instruments of production, but against the mode in which they are used.¹⁶²

But he clearly misunderstood the significance of Luddism. It is absurd to think that workers objected to machines simply as machines. The idea that machine breaking was some form of primitive superstition, a displacement of the relationship with the owner on to that with the machine, is to fail to understand that the machine is part of the power of the owner. Machinery was the embodiment of capital. As the Hammonds observed, "The struggle is not so much against machinery as against the power behind the machinery, the power of capital."¹⁶³

Marx's criticism of machine breaking and the Luddites has been repeated in one form or the other by many and sundry. It has been said that their hopes and ambitions were reactionary and short-sighted, that they didn't understand their situation and they couldn't hope to stem the tide of history and win against the new economic order, and that it was obvious they would be defeated in the long run. Of course in the long run they would also be dead, and in the meantime they had to eat. As we have seen, some, though not all, of the incidents of machine breaking did succeed in postponing impoverishment and oblivion for a generation or two.

Machinery, like any other kind of technology, cannot be understood on its own. It makes sense only within a context, as part of an organization of work which is part of an economic system which in turn

is part of what a society intends to be for its people. Neither the rising capitalists nor the working people of the Industrial Revolution failed to understand that, implicitly if not explicitly. Machinery has no history of its own. Machines did not appear as the physical expression of some kind of independent pre-ordained logic of technological evolution. Rather, machinery was developed and applied under the influence of the priorities of the business system, by the nature of the inventive process. The kind of machinery developed, the methods by which it is applied to the production process and the uses to which it is put reflect the intentions of those in control of the business system. That remains as true today, if not more so, as it was during the Industrial Revolution.

The development of machinery and the form that the division of labour took under the rise of the capitalist system could almost be characterized as a teleological process, if we realize that they evolved under conditions that determined their usefulness in advance. What this means is that the rising dominance of the capitalist system called into being that which was necessary for itself--in this case, certain kinds of machinery and ways of combining labour with them which together formed the organization of work that conformed to the needs of the system. During the Industrial Revolution, that process was an ad hoc informal one: it was not yet systematic and thorough. Capital had not yet established hegemony over important parts of the structure of society such as education and science that would serve to make that process systematic and thorough. Although Andrew Ure saw in the invention of the self-acting spinning mule the great power resulting

when "capital enlists science in her service," the full magnitude of that power had yet to be seen. It wasn't until the end of the century in which Ure wrote that we see the full force of the enlistment by capital of science in its service. The results of the establishment of hegemony by the business system over science and education are clearly shown in the application of the engineering mentality to the division of labour and to the innovation of new machinery through research and development, both of which took place in a systematic way in the decades before and after the beginning of this century in the United States. That is the subject of the next chapter.

The Industrial Revolution in England was the inevitable consequence of capitalism coming into its own as a mode of economic activity. The conquest of economic and political power by the capitalists wrought great changes in the structures of society. The subjugation of the organization of work to the managerial need of the capitalists to extend control over the production process was only one of those changes. This chapter has attempted to show how the appearance of the centralized workplace, an employer enunciated and enforced discipline on the job, the detail division of labour and the accelerated innovation and application of machinery were related to the logic of the needs of employers inherent in the emerging capitalist system of production. The next chapter is concerned with further refinements of the capitalist organization of work that occurred around the beginning of this century in the United States.

FOOTNOTES TO CHAPTER FOUR

1. Sahlins, Chapter One, especially p. 15-6.
2. Melvin H. Kranzberg and Joseph Giles, By the Sweat of Thy Brow: Work in the Western World (New York: G.P. Putnam's Sons, 1975), p. 4.
3. L.A. Clarkson, The Pre-Industrial Economy in England 1500-1750 (London: B.T. Basford, 1971), p. 103.
4. E. Lipson, The History of the Woollen and Worsted Industries (London: Frank Cass & Co., 1965), first pub. 1921 by A & C Black, p.
5. J.L. Hammond and Barbara Hammond, The Rise of Modern Industry. (London: Methuen and Co., 1925), p. 100.
6. D. C. Coleman, Industry in Tudor and Stewart England (London: Macmillan Press, 1975), p. 19.
7. Lipson, p. 34.
8. Clarkson, p. 104-5.
9. Clarkson, p. 104 and G.D.H. Cole, A Short History of the British Working Class Movement 1789-1947 (London: George Allen and Unwin, 1948), p. 12.
10. Hammond and Hammond, p. 99.
11. Lipson, p. 31-2.
12. Hammond and Hammond, p. 99 and David Dickson, Alternative Technology and the Politics of Technical Change (Glasgow: William Collins Sons and Co., 1974), p. 72.
13. Paul Mantoux, The Industrial Revolution in the Eighteenth Century (London: Jonathan Cape, 1961), p. 62-5 and John Addy, The Textile Revolution (London: Longman Group, 1967), p. 6.
14. Mantoux, p. 67.
15. Clarkson, p. 101.
16. Mantoux, p. 58-61 and Addy, p. 7-8.
17. Report from the Select Committee appointed to consider the State of the Woollen Manufacture in England, 1806, p. 1. Quoted in Mantoux, p. 61.

FOOTNOTES TO CHAPTER FOUR CONTINUED

18. David S. Landes, The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present (Cambridge: Cambridge University Press, 1969), p. 45.
19. Clarkson, p. 105 and G.D.H. Cole, p. 13.
20. Mantoux, p. 32.
21. Kranzberg and Giles, p. 84.
22. W.J. Ashley, An English Economic History and Theory (London: Longmans, Green and Co., 1925), 4th ed., first pub. 1893, Part II, p. 255n. as quoted in Jurgen Kuczynski, The Rise of the Working Class (New York: McGraw-Hill, 1967), p. 7.
23. Ashley in Kuczynski, p. 7.
24. Lipson, p. 47-9.
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CHAPTER FIVE

WORK AND WORKERS DURING THE PROGRESSIVE ERA

Changing Economic Conditions

The period between 1875 and 1920 was a time of great economic and social change in the United States, as well as elsewhere in the economically developed world. The United States entered this period as a primarily rural agrarian society and emerged from it as an urban industrial society; in fact, as the world's foremost industrial power. In 1870 one in four people lived in an urban area. By 1920 the number had increased to one out of every two people.¹ Along with this population concentration came other kinds of concentration: financial and industrial. It is during this period that we can locate the origins of what has been called monopoly capitalism. Simply stated, monopoly capitalism is a way of referring to the replacement of small time competition among many firms whose share of a given market is relatively insignificant in proportion to the overall size of the market by limited competition among a few large firms that have a significant share of and control over their market. The emergence of a few firms with a large share of their market was accompanied by a striking growth in the absolute size of manufacturing firms. According to Daniel Nelson, "During the last third of the nineteenth century the 'average' plant in 11 out of 16 major industries more than doubled in size."² In 1870 one of the nation's largest factories, the McCormick plant in Chicago, had

no more than 400 to 500 employees. Thirty years later, there were more than 1,000 factories employing 500 to 1,000 people and 443 that had more than 1,000 workers. The 22 largest had more than 4,000 employees.³

The process by which monopoly capitalism came into being was one of intense competition. During the last half of the nineteenth century, the dynamic of competition destroyed the viability of competition in the economy. During upswings in the business cycle, manufacturers raced to increase their production. They made heavy capital investments in plant which saddled them with high overhead costs and excess capacity during recessions in the business cycle. Under the burden of high overhead costs during those recessions, manufacturers were forced to cut prices to lower than the full cost of their product in order to generate some revenue to service as much of those overhead costs as they could. They had to sell their products, even at a loss. Under those conditions, the weaker and less skillfully managed firms went bankrupt, leaving fewer and bigger firms in any given sector of industry. The position of the remaining firms was strengthened, only to be tested again during the next downturn in the business cycle. Thus the dynamic of competition led to the destruction of those business which could not hold out during recessions. Competition engendered among manufacturers that managed to survive the variations in the business cycle a strong tendency to want to limit the instability and insecurity associated with price competition. It was in the interest of surviving businesses to put a stop to their vulnerability to price competition. That was a prime reason for the appearance of branded commodities, as Smythe explains in his forthcoming book:

If...a partial monopoly could be created for the product of a particular manufacturer, a partly captive market could protect that manufacturer's product from price competition and might avoid the losses and possible bankruptcy which followed in periods of the cyclical depression. Advertising of brand names was the means to that partial monopoly in the selling market for a commodity...⁴

The restriction of competition was also the purpose of the famous dinners held by Judge Gary, the President of U.S. Steel, at which informal agreements to fix prices were made by the executives of the subsidiaries of the corporation. The industrial empires forged around the turn of the century in the United States and elsewhere were the natural result of cut-throat competition. The instability of the competitive struggle for survival led to the formation of monopolies by the more powerful financial and industrial enterprises in order to minimize the threat posed by competition.

In this kind of business climate, every competitive edge that a firm could gain was crucial to its ability to survive. Any restriction on the absolute freedom of owners to operate their business so as to take advantage of whatever opportunity came their way was a hindrance and a threat. Both the organization of workers in unions and many aspects of the traditional organization of work in turn of the century factories constituted a restriction on the freedom of the employing owners. This period saw an upsurge of concerted attempts to undermine and destroy both what remained of workers' control over their on the job shop floor activities and unions, the organizations of workers that in part expressed and defended their limited control.

It was at this time that "management" appeared as a distinct and recognized area of endeavour in the business world. Its emergence as a conscious and self-reflective activity was an extension of the growing need to plan carefully and organize all aspects of a firm's operations in order to maintain and improve its competitive position. The management activities of the captains of industry soon began to encompass efforts to increase their ability to control the factory work force.

Attempts to increase control over the workforce led to profound alterations in the organization of work, and over a period of time the managerial movement into the realm of work organization wrought far-reaching changes in the industrial and social landscape. These changes constituted the foundation upon which much that is characteristic of the modern organization of work is built. The origins of some of the most significant aspects of the workplace as a communication system can be traced to developments in this period. Much of what was being fought over was the possession and control of knowledge in the workplace.

This chapter focusses on the developments in the organization of work that took place in the United States in the period between 1880 and 1920. The United States at that time was rising to the forefront of international industrial expansion, and it was here that the second revolution in the modern organization of work unfolded, though that revolution soon found its way to other countries with strong and growing economies, including Canada.⁵ The first section of this chapter describes the way the labour process was organized prior to the great changes that

were to come. The forms of work organization that had come to be traditional in factories by the latter part of the nineteenth century were the subject of an attack by employers and managers that became more vehement and thorough as time went on. The second section examines the first thrust of that attack which concentrated on unions, since they were the most obvious expression of the existing degree of worker sovereignty in the workplace. The third section is concerned with the second phase of attack on the traditional factory organization of work, the rise of the scientific management movement. The effects of this movement on modern concepts of workplace organization and communication in the workplace cannot be underestimated. The fourth section looks at the introduction of a new kind of hierarchy in the organization of work: job ladders. They were the finishing touch on the radical changes in the labour process that were initiated as part of the scientific or systematic management movement, and are an important component in the flavour of the modern organization of work.

Many examples will be taken from the steel industry. The events that are the subject of this chapter unfolded in those industries that were in the forefront of economic growth. The steel industry was among the most important. The steel industry in the United States generated the world's first billion dollar corporation, U.S. Steel.

The Hierarchy of Workers' Control in the
Late Nineteenth Century Factory

If we were to look in on the shop floor of an average factory in the 1880s or 1890s, we would find a relatively simple, unrefined and incomplete kind of hierarchical control of workplace activities based on the retention of some shop floor autonomy by skilled workers. In the late nineteenth century, factory owners left many of what later became management functions to their foreman or skilled workers, including the hiring and supervision of other workers and, through indirect ways, the control over production levels. In many respects, the rights and responsibilities of the foremen or skilled worker constituted something approaching an empire. The early simple forms of hierarchical control in the organization of work were built with those little empires.

The contract system, prevalent in the iron and machine industries among many others, provides an example of one of the traditional kinds of work organization in the late nineteenth century factories. It was used in many of the larger operations as a way to coordinate production activity. Under the contract system the factory owner contracted with a skilled craftsman to produce a given product of a specified quality for a set price agreed upon in advance. The company provided the materials, tools and other necessities. The contracting skilled craftsman then hired his own work crew. He negotiated the price of their labour with them, based on what he was getting paid by the factory owner. His crew usually got a day rate. The contractor got what was left over from the contract price after the crew had been paid. Often the wages of the

crew flowed almost automatically from the price of the overall contract since there were traditional wage differentials between workers according to the kind of work they performed on the contract. The contracting skilled craftsman had a wide-ranging autonomy. According to Daniel Nelson, they

"...made virtually all the important decisions relating to what, when, how and by whom the product would be made...the contractors had nearly complete control over the factory work force."⁶

The contract system of nineteenth century America bore some resemblance to the putting-out system of eighteenth century England. The nineteenth century factory owner and the eighteenth century putter-out both gave raw materials out to be worked on by people who were not strictly speaking their employees. This serves as a reminder that the development of the modern organization of work did not proceed along a rigid linear path. The traditional organization of work in nineteenth century America reflected the initiatives taken by employers during the Industrial Revolution in England, but not entirely. In the contract system, work was performed on the employer's premises, but the control of the employer in the labour process was still not firmly established. The contract system as a way of organizing work was in a sense the putting-out system inside the factory.

The helper system was another variation on the simple hierarchical method of organizing production. The position of the skilled worker in the helper system was very similar to the skilled worker's position in the contract system. The craftsman was paid a large sum for the completion of a certain amount of work. Out of this large sum, he had

to pay the wages of his assistants and helpers. The craftsman's wage was usually linked directly to his output, while the helpers were paid a fixed daily rate.

Both the contract system and the helper system are characterized by David Montgomery, a historian of workers' control, as embodying "the functional autonomy of the craftsman". He lists iron molders, glass blowers, coopers, paper machine tenders, locomotive engineers, mule spinners, boiler makers, pipe fitters, typographers, jiggersmen in potteries, coal miners, iron rollers, puddlers and heaters among the craftworkers who performed their work under conditions of functional autonomy.⁷ Under both systems there was a hierarchy of jobs through which a worker on the bottom in the lowest paid position could hope to rise to a higher paid and higher status position. That job hierarchy was articulated on the basis of skill. The ones at the top were the most highly skilled, and the ones at the bottom were the least skilled. The gradations reflected real, discrete and easily recognized differences in skill and experience requirements for specific job functions. As we shall see later, the dismantling of job hierarchies based on immediately obvious levels of skill was one part of the change in the organization of work that was to come.

Owners of factories in which the contracting or helper system was not practiced made use of the foreman to oversee shop floor production. Foremen then had a wider degree of freedom to run their department as they saw fit than they generally do in contemporary factories. They were usually left alone by the owners to handle most aspects of

what happened on the shop floor. According to Nelson, they made decisions about

"...how the job was to be done, the tools and often the materials to be used, the timing of operations, the flow of work, the workers' methods and sequence of moves... they were held accountable for what the workers did...in personnel matters-the hiring, training, supervising, motivating, and disciplining of factory workers-the foreman had virtually complete control."⁸

Nelson is somewhat misleading when he says "complete control" because he doesn't convey an impression of the extent to which the workers under the purview of the foremen themselves exercised some autonomy in their working activities. He may perhaps be forgiven because he is trying to make the point that it was the foreman, skilled worker or contracting worker who enjoyed many of the powers that were later transferred to managers.

It is important to realize that at that time, managers as such did not exist. The appearance of managers went hand in hand with the replacement of simple forms of hierarchical work organization by more refined hierarchies that greatly reduced the scope of the skilled workers' and foremens' domain. In its place was established the domain of the manager.

The manager's domain was carved out not only by dismantling the empire of the skilled contracting worker, craftsman and foreman, but also by an assault on the traditional autonomy of the other workers. The traditional autonomy of nineteenth century factory workers was, of course, not absolute. But it was relatively strong enough to have

placed limits on the authority of foreman and on the behaviour of contracting workers on the one hand, and on the ability of employers to assert managerial authority as quickly as they wanted on the other hand. The degree of traditional autonomy that factory workers in nineteenth century America enjoyed was expressed in two ways: through a moral code and through union rules.

Factory and other workers had formulated what amounted to a kind of moral code prescribing certain standards in their workplace behaviour. It was a statement of what each worker had a right to expect of other workers, and it was a manifestation of some degree of class consciousness and solidarity. For example, in most branches of industry there were standards accepted by the workers among themselves as to what constituted a fair day's output. In the iron industry, five firings of the furnace was considered to be a day's work.⁹ Anyone willing to work more than this was considered to be a self-seeking money grubber with no compunctions about doing the work of more than one man, and thereby depriving another worker of a job.

The moral force of those definitions of a fair day's work were frequently codified in union rules. Union rules extended far beyond a definition of a fair day's work, however. Most unions in the late nineteenth century were craft unions built on the exercise of craft knowledge and skill. The rules of the craft unions covered many areas that have today become part of management's rights and prerogatives. Union rules commonly contained specifications about the quality of product, the materials to be used, the tools to be used and the methods of completing

work tasks. Some examples from the building trades are: bricklayers had rules against laying bricks with more than one hand and against spreading mortar with any implement other than a trowel. Those rules had the effect of restricting the speed with which bricks could be laid and were intended to encourage careful good quality work. The bricklayers' and masons' union rules also placed restrictions on the use of certain kinds of machines. The machines had to be operated by union members, and could not be worked longer than the hours customarily worked by their members. A certain number of employees were required to be hired for each machine that the employer operated. If employees who did not work on certain machines were laid off, then a proportional number of employees who did work on the machines also had to be laid off.¹⁰ Many unions also had rules regulating absenteeism and drunkenness affecting the ability to work. The rules were intended to protect the livelihood of those who practised the trade, and to maintain worker determined standards of quality and quantity of performance. Unions were not in the habit of negotiating the rules with employers: union rules were not the employers' business. The unions attempted to answer infractions of their rules on the part of employers with boycotts and strikes. Infractions of the rules by members met with fines and other punishments. Workers who seriously or habitually infringed on the rules were not uncommonly ostracized by their fellow union members. In many factories, work sites and industries, foremen were required by the skilled workers to join the union so that they would be subject to union discipline regarding adherence to the union's shop floor rules.

Bruno Ramirez, an historian of industrial relations in the U.S. during the turn of the century, gives an idea of the extent of union rules:

Through the so-called union rules, craft unions had been in a position to impose on employers conditions bearing on virtually all aspects of the organization of production: the manner in which new machinery and new work techniques were introduced, the number of apprentices to be allowed to work in a given shop, the method of wage determination, and control over the classification of work.¹¹

Union rules embodied a form of workers' control which was an obstacle to the ability of employers to take advantage of possibilities for improving the competitive position of their companies.

Craft unions in general constituted a serious challenge to the expansionary instincts of the rising industrialists. The challenge resulted from the unions' defense of the traditional factory organization of work in which skilled workers retained a relatively great power to determine their own working conditions, as well as from the actions of the unions aimed at keeping wages up. While employers for the most part had always been fighting unions when they could, there was a renewed determination in their fight against unions in the decades before and after the turn of the century. That renewed determination was inspired by the increasingly intense competition associated with the whirlwind consolidation of the giant financial and industrial empires at that time. The fight against unions, and what that meant for the radical changes in the capitalist organization of work, are the subject of the next section of this chapter.

The Destruction of Workers' Control:
The Attack on Unions

During the heat of the intense competition associated with the formation of the great monopolies in the last years of the past century, attempts by the expanding firms to improve their competitive position led to concerted and ferocious attacks on the existing degree of workers' control, on the private empires on foreman and contractors, and on unions. All those phenomena were united by the common goal on the part of employers to put themselves more firmly in the driver's seat of their enterprises.

The owners loathed the unions for a variety of reasons, not the least of which was that they saw the unions as an obstacle to exerting their own control over what happened at the point of production in their operations. Many of the fiercest battles between capital and labour in the last years of the nineteenth century were fought over the question of union recognition. The famous Homestead strike of 1892 provides an excellent example.

The organization of work at Andrew Carnegie's steel mill at Homestead, Pennsylvania, was based on a combination of the contract and helper system. The company contracted with the skilled workers through their union, the Amalgamated Association of Iron Steel and Tin Workers, to produce a certain amount of product at a given rate per ton. The rate was contingent on a sliding scale that corresponded to market prices. When the market price went up, the company's labour costs went up automatically. The union took the tonnage rate contracted for by the

company according to the market price, and divided it up among all the various kinds of skilled workers involved in producing the product. Calculated into their negotiations among themselves was the amount to be paid to their unskilled helpers. The company also paid a small percentage of the helper's wages. If a skilled worker wanted to hire more than the number of helpers provided for him, he paid them out of his own wages.¹² That system of organizing and compensating labour did not leave the company much control over its labour costs, or over the pace and efficiency of production. Catherine Stone, in her study of labour in the steel industry, summed it up like this:

The price [of a contracted job] was determined by the market, and the division of labor and the pace of work was decided by the workers themselves.¹³

In a time of rapidly expanding markets and intense competition for those markets, employers in the steel industry found this system to be a great hindrance.

They were further annoyed by the constraints imposed upon them by the formalized control over activities at the point of production that the union gave the workers. The Amalgamated Association of Iron, Steel and Tin Workers was one of the strongest of the day, if not the strongest. The union had a string of rules intended to prevent speedups and overstrain among the workers, and there were also rules that served to maintain the division of labour they had arranged among themselves on the basis of their craft knowledge. This is how a company historian described it:

Every department and sub-department had its workmen's "committee", with a "chairman" and a full corps of officers...hardly a day passed that a "committee" did not come forward with some demand or grievance. If a man with a desirable job died or left the works, his position could not be filled without the consent and the approval of an Amalgamated committee...The method of apportioning the work, of regulating the turns, of altering the machinery, in short, every detail of working the great plant, was subject to the interference of some busybody representing the Amalgamated Association. Some of this meddling was special under the agreement that had been signed by the Carnegies, but much of it was not; it was only in line with the general policy of the union...The heats of a turn were designated, as were the weights of the various charges constituting a heat. The product per worker was limited; the proportion of scrap that might be used in running a furnace was fixed; the quality of pig-iron was stated; the puddlers' use of brick and fire clay was forbidden, with exceptions; the labor of assistants was defined; the teaching of other workmen was prohibited, nor might one man lend his tools to another except as provided for.¹⁴

The union also had rules defining what a "job" was, and prohibiting its members from doing more than one.¹⁵ All of this prompted a Carnegie Steel Company official to say that "when the union was firmly entrenched at Homestead, the men ran the mill and the foreman had little authority."¹⁶

The prevailing situation of worker control at the point of production formalized through the rules and policies of the union led to a powerful desire on the part of the company to exterminate the union. The upcoming negotiations in 1892 to renew the three year old contract with the Amalgamated Association presented the company the opportunity they needed. Andrew Carnegie installed Henry Frick, who had presided over union-busting in the coke fields, to run the mill during negotiations. Frick started by proposing a wage cut, even though the steel industry was on the upswing. The Amalgamated, of course, refused the offer. Frick responded by fortifying

the mill, encircling it with a high fence with rifle slits in it and barbed wire on top. He announced that if the workers did not accept his offer within one month, the company would henceforth cease to recognize the union, and deal with the workers as individuals. A strike began a few days after the end of the stipulated acceptance period.

Briefly, the events of the strike, which was one of the most notorious in U. S. labor history due to its bitterness and length, and the violence that arose from it, are as follows: a few days into the strike, three hundred Pinkerton guards, arranged for prior to the beginning of the strike, arrived on Frick's orders with the express intention of taking over the mill so that it could be run using scab labour. The entire town came out to turn them back. A pitched battle ensued in which about sixty people were shot, sixteen fatally. In the end, the Pinkertons retreated, pursued and badly beaten by the workers' wives. Shortly after that event, which attracted nation-wide attention and horror (for widely differing reasons), 8,000 soldiers of the National Guard took over the town, and the mill resumed operations using scab labour. The strikers held out for a further five months until, defeated by hunger, evictions from company houses and costly court actions, they voted to end the strike.

Almost none of the union men got their jobs back. When they went to ask for them, they discovered that new production methods and new machinery installed during the strike had made them replaceable by easily trained unskilled labour. Grievance committees and workers meetings were banned. Wages were slashed far more than had been

originally proposed. Twelve hour days and seven day weeks were the rule rather than the exception.¹⁷ Frick sent a cable to Andrew Carnegie:

OUR VICTORY IS NOW COMPLETE AND MOST GRATIFYING.
DO NOT THINK WE WILL EVER HAVE SERIOUS LABOR
TROUBLE AGAIN. WE HAD TO TEACH OUR EMPLOYEES A
LESSON AND WE HAVE TAUGHT THEM ONE THEY WILL
NEVER FORGET.

Frick received the following reply:

LIFE WORTH LIVING AGAIN. CONGRATULATE ALL
AROUND.¹⁸

Although the immediate cause of the Homestead strike was a conflict over reduction of wages, as John Fitch noted in his investigation of the steel workers: "There was another issue...that issue was unionism".¹⁹ There is little question that the intention of Carnegie and Frick even before the strike began was to free themselves of union interference. Carnegie had written a directive to Frick prior to commencement of negotiations which said "These works...will be necessarily non-Union after the expiration of the present agreement." Fitch reports that many of the strikers believed that "Frick deliberately sought the conflict because he wanted to drive the union out of Homestead" and that "they were going into a fight to determine their right to united action."²⁰ That they had cause for these beliefs is borne out by the statement made by the company the day after the outbreak of violence during the strike:

This outbreak settles one matter forever, and that is that the Homestead mill hereafter will never again recognize the Amalgamated Association nor any other labor organization.²¹

The Homestead strike of 1892 was the first shot in a long and ultimately successful fight by the big steel companies (and other major industrial enterprises) to gain greatly increased control over their labour force. The victorious result for Carnegie Steel gave other employers in the industry the encouragement they needed to engage in a showdown with the union on their own territory. And it spelled the end for the Amalgamated Association of Iron, Steel and Tin Workers. In just two short years, the Association, once the pride of the American Federation of Labor, had lost nearly half its membership as a consequence of being forced out of one mill after another. By 1910, for all intents and purposes, it no longer existed.²² The extermination of the Amalgamated Association meant that U.S. Steel, then the world's largest corporation (which was formed in part out of Carnegie Steel), could operate free of the power and control that workers' skill and union organization had given them over their working conditions and activities at the point of production. Without the union to contend with, the steel moguls had a freer hand to reorganize the division of labour in their mills using unskilled or semi-skilled workers and new techniques that further weakened the formerly strong and priveleged position of skilled workers who had previously controlled production.

The steel industry showed the way. Other employers followed closely behind. The years around the turn of the century saw an unprecedented, widespread and fairly successful attack on unions by large employers. The intentions of those employers were succinctly summarized by Fitch:

The motive back of the destruction of unionism was desire for administrative control. That control did not rest entirely in the hands of the employers so long as there was²³ a strong organization among their employees.

The employers were aiming for complete control over methods of work, levels of output, quality of finished product, hiring and firing the number and kind of workers they wanted and the freedom to implement any kind of payment system they wanted. They wanted no interference from workers in determining the division of labour on the shop floor, or in determining the kind of equipment and machinery they would use. Some of those goals are expressed in the adopted principles of the National Metal Trades Association which represented the employers of over 30,000 workers and was one of the country's foremost employers' organizations.

They are reproduced in part by Ramirez as follows:

CONCERNING EMPLOYEES 1. Since we, as employers, are responsible for the work turned out by our workmen, we must have full discretion to designate the men we consider competent to perform the work and to determine the conditions under which that work shall be prosecuted, the question of the competency of the men being determined solely by us. While disavowing any intention to interfere with the proper functions of labor organizations, we will not admit of any interference with the management of our business.

APPRENTICES, ETC. 4. The number of apprentices, helpers and handymen to be employed will be determined solely by the employer.

METHODS AND WAGES 5. We will not permit employees to place any restriction on the management, methods or production of our shops, and will require a fair day's work for a fair day's pay.

Employees will be paid by the hourly rate, by premium system, piece-work or contract, as the employers may elect.

FREEDOM OF EMPLOYMENT 6. It is the privilege of the employee to leave our employment whenever he sees fit, and it is the privilege of the employer to discharge any workman when he sees fit.²⁴

By the early years of the twentieth century, the battle for control had precipitated a great number of confrontations. According to David Montgomery, strikes over control reached an all time high in 1903.²⁵ Almost 40 percent of all strikes during the next year were fought over recognition of union rules or of the union itself. The number of lockouts caused by those issues was higher than ever.²⁶

The victory of the big steel employers over the Amalgamated Association was a significant blow to the privileged and relatively powerful position of the skilled workers. It gave the employers the opportunity to replace them with a combination of new techniques and semi-skilled workers who provided the labour needed for those new techniques. A rapid increase in mechanization followed the defeat of the skilled workers in the steel industry. Mechanization went hand in hand with a levelling of the kinds of workers employed in the industry. The intricate hierarchy from skilled to unskilled worker collapsed with the increasing use of semi-skilled workers to operate the various kinds of machines. The disappearance of the hierarchy of limited workers' control gave employers more power to make and implement decisions about what went on at the point of production in their mills. It theoretically gave them the power to increase control over levels of output, quality of product, hiring and firing, methods of work and all the other things that the skilled workers through their unions had previously had a strong voice in.

The disappearance of that limited hierarchy of worker's control presented employers with two new problems. The first was that the built in motivations to do a good job (since skilled workers had in a sense been partners in production) that were part of that hierarchy were removed, leaving an obvious and serious lack of motivation for workers to provide cooperation to their employers. This became known as "the labor problem". The second was that employers discovered that they really did not have systematic knowledge of production processes at the shop floor level upon which to base managerial decisions. That problem was aptly expressed by Big Bill Hayward of the Industrial Workers of the World: "The manager's brains are under the workman's cap." The scientific management movement was one of the employer's attempts to solve those problems. The institution of a new kind of hierarchy was another move towards solving those problems. The next two sections of this chapter will deal with those two developments.

The Destruction of Workers' Control:
Scientific Management

It has become popular in recent years to identify scientific management with the efforts of Frederick Winslow Taylor. What Taylor did was to coalesce and refine the ideas that were being tried out by a number of people in a number of different situations into an articulated system. His work was neither the beginning nor the end of the line of reasoning that he has come to represent, though he did put the name of scientific management to it.

The first approximations to the so-called scientific system of

management originated before the previously mentioned problems arose from the crumbling of the hierarchy of skilled workers. The ideas that contained the embryonic form of scientific management can be traced in part to the increasing role of the engineer in the industrial corporation. Since the beginning of the Industrial Revolution, employers and engineers working for them had devoted constant and considerable effort to developing machinery which would increase the productivity of labour. Until the later part of the nineteenth century, the innovation of machinery under the influence of the capitalist logic of production had not been systematic. Then the business system started to consolidate its hegemony over the inventive process through rearranging and expanding the ways that research and development were carried out. The enlistment of science in the service of capital became more complete than Andrew Ure ever dreamed. The development of new machinery through systematic research and development was one side of the enlistment of science in the service of capital. The scientific management approach was the other side.

Around the end of the nineteenth century, it was becoming increasingly clear that the mechanical component of the labour productivity equation was not the only limiting factor and that the organization of work within the productive process, and the ability to compel higher levels of performance within that organization, was an equally limiting factor. There was an increased interest in finding ways of extracting more out of the labour that was paid for. That interest was spurred on by the furious competition in that era of mergers that left us the industrial empires that are today's major corporations. Engineers began a more systematic

search for ways to reorganize the internal operations of factories to increase profitability than ever before. Their efforts were not limited to the purely technical. They developed new methods for a wide variety of what are now managerial functions, such as cost-accounting and comprehensive book-keeping. That was the beginning of modern management.²⁷

When the engineers cast their eyes on labour, their first efforts were in experimentation with systems of payment. The assumption they operated under was that by tinkering with the methods of wage payment, they could devise one that would have the effect of getting workers to work harder. Employers had been attempting to make use of piece rates in increasing numbers throughout the second half of the nineteenth century. Then there was a rush to implement piece rates in the steel industry following the demise of the old sliding scale tonnage rate. Employers liked the idea of the piece rate because it seemed to link wages directly to productivity. In theory, the more a worker worked, the higher his wage would be. This would provide the worker with an incentive to produce more. What happened in reality was different, as a visiting industrialist from England observed at the time:

Piece rates are fixed only to be cut as soon as the employee develops the ability to increase production. It does not require any great length of time for a workman to realize that he will get about the same amount of money whether he works fast or slow.²⁸

An article in the industry magazine Iron Age admitted as much:

Regardless of the continually increasing cost of living, the manufacturers decide among themselves,

for example, that \$1.50 for 10 hours is enough for a woman and that \$2.50 a day is enough for the ordinary working man and a family. The piece work prices are then adjusted so that the normal day's output will just bring about these wages.²⁹

The move toward piece rates was not limited to the steel industry. Many unions representing the workers affected were against piece rates. The comment of an official of the International Association of Machinists is a good example of workers' attitudes toward piece rates:

A change in the method of work in a shop whereby each workman will have to expend from 50 to 100 percent more energy, which in turn will produce 50 percent to 100 percent more product for the same pay, fully meets his idea of robbery.³⁰

Employers and those working on their behalf searched for more sophisticated ways of using wage payment systems to increase production. That search led them to the discovery of systems like the differential piece rate, and the bonus and premium plans. Most of those plans involved setting a basic production quota for a worker's daily output, and then paying an extra amount of money for work that exceeded the basic quota in the form of a bonus or a higher piece rate. Naturally, the extra pay received by the worker did not match the extra output he had to produce to earn it. The engineering magazines and industry magazines from just before the turn of the century were filled with articles describing the variations on those wage incentive schemes.

The wage incentive schemes were designed to motivate workers to work harder. But they had another very interesting effect on relations among the workers which was not overlooked by employers. That effect

was to encourage the workers to see their self interest as individuals, and to discourage collective actions against the employer based on the community of interest of all workers. The wage incentive plans invited the worker to increase his wage through the pursuit of individual ambition in competition with other workers. Many employers thought that this was the solution to "the labor problem". In the words of one manufacturer in 1928, the usefulness of such incentive schemes was:

...to break up the flat rate for the various classes of workers. That is the surest preventative of strikes and discontent. When all are paid one rate, it is the simplest and almost inevitable thing for all to unite in the support of a common demand. When each worker is paid according to his record there is not the same community of interest. The good worker who is adequately paid does not consider himself aggrieved so willingly nor will he so freely jeopardize his standing by joining with the so-called "Marginal Worker." There is not likely to be union strikes where there is no union of interest.³¹

The wage incentive scheme does not remain in such wide use today as some employers from this period might have hoped. But the plan of consciously discouraging a union of interest among workers has remained in a different form. That form, as we shall see in the section following this one, was the construction of a job hierarchy under the employer's control.

One of the principles of Scientific Management, as elaborated by Taylor, was to encourage workers to pursue their individual private self interest. Taylor first conceived of his systematic approach to "the labor problem" as a variation on the wage incentive scheme. His first description of it, delivered to the American Society of Mechanical Engineers in 1895, was entitled "A Piece Rate System".

As Taylor himself tells the story, he developed the first version of his system as a way to destroy the collective action taken by workers to prevent overwork, or what was called by employers "soldiering". Taylor, who worked his way up from the ranks of the shop floor in the Midvale Steel Company, at first believed that his primary objective was to eliminate the collective limit to the speed of work established by groups of workers. That limit was traditionally placed somewhere below what might be called a theoretical absolute capacity. The question of how hard workers should work has no absolute answer. All that can be said absolutely is that workers cannot constantly work as hard as they possibly can without considerable risk to their health and safety. What level below the theoretical maximum constitutes the optimum level is a matter of interpretation. Not surprisingly, employers have frequently taken the view that workers have not reached that optimum level. Big employers at the turn of the century were of the opinion that workers were deliberately not performing at that optimum level. They called it "restriction of output" and they set out to destroy it. The unions and the workers took the opposite view. They called what the employers were up to "robbery" and they set out to prevent it. And so the struggle was joined to define the meaning of "A fair day's work for a fair day's pay." Taylor was instrumental in that struggle. It was Taylor's intention to ensure that "what constitutes a fair day's work will be a question for scientific investigation, instead of a subject to be bargained and haggled over."³²

In his early efforts to win the war against soldiering, Taylor concentrated on getting workers to work harder through a kind of bonus

system that established a large bonus to be paid to workers who exceeded a certain level of production in a day. That level was far in excess of what was a customary day's work. The bonus was large, but not in proportion to the increased productivity needed to earn it.

Taylor achieved some success in breaking the team spirit of the men at Midvale Steel Company through his bonus system. His bonus system was really nothing new, as has been pointed out above. However, it was only the beginning.

What Taylor did that was new is illustrated by his famous Schmidt experiment which he carried out a few years earlier to establish the level of production for which a bonus would be paid while he was working for Bethlehem Steel. Taylor decided that the 12½ tons of pig iron being loaded into railway cars by pig iron handlers per day was not enough. Instead, he ascertained for himself that "47 tons was a proper day's work for a first-class pig-iron handler." He then set about getting the men to do a proper day's work. The story of the method by which he achieved that is fascinating and worth repeating at length. Taylor observed the men for a few days to select the object of his attentions. His choice was an immigrant worker who apparently had exceptional stamina as he was accustomed to "trot back home" every day after a full day of work, covering the distance of about a mile with no sign of exhaustion. This man, whom Taylor called Schmidt, had the further advantage from Taylor's point of view of being a pennypincher. He had managed on his wage of \$1.15 a day to buy a small piece of land, and was busy building a house on it before and after work. Taylor, having identified this man as the most

promising for his purposes, singled him out from the gang of workers and had more or less the following conversation with him:

"Schmidt, are you a high-priced man?"

"Vell, I don't know vat you mean."

"Oh yes, you do. What I want to know is whether you are a high-priced man or not."

"Vell, I don't know vat you mean."

"Oh, come now, you answer my questions. What I want to find out is whether you are a high-priced man or one of these cheap fellows here. What I want to find out is whether you want to earn \$1.85 a day or whether you are satisfied with \$1.15, just the same as all those cheap fellows are getting."

"Did I vant \$1.85 a day? Vas dot a high-priced man? Vell, yes, I vas a high-priced man."

"Oh, you're aggravating me. Of course you want \$1.85 a day - every one wants it! You know perfectly well that that has very little to do with you being a high-priced man. For goodness' sake answer my questions, and don't waste any more of my time. Now come over here. You see that pile of pig iron?"

"Yes."

"You see that car?"

"Yes."

"Well, if you are a high-priced man, you will load that pig iron on that car to-morrow for \$1.85. Now do wake up and answer my question. Tell me whether you are a high-priced man or not."

"Vell - did I got \$1.85 for loading dot pig iron on dot car to-morrow?"

"Yes, of course you do, and you get \$1.85 for loading a pile like that every day right through the year. That is what a high-priced man does, and you know it just as well as I do."

"Vell, dot's all right. I could load dot pig iron on the car to-morrow for \$1.85, and I get it every day, don't I?"

"Certainly you do - certainly you do."

"Well, den, I vas a high-priced man."

"Now, hold on, hold on. You know just as well as I do that a high-priced man has to do exactly as he's told from morning till night. You have seen this man here before, haven't you?"

"No, I never saw him."

"Well, if you are a high-priced man, you will do exactly as this man tells you to-morrow, from morning till night. When he tells you to pick up a pig and walk, you pick it up and you walk, and when he tells you to sit down and rest, you sit down. You do that right straight through the day. And what's more, no back talk. Now a high-priced man does just what he's told to do, and no back talk. Do you understand that? When this man tells you to walk, you walk; when he tells you to sit down, you sit down, and you don't talk back at him. Now you come on to work here to-morrow morning and I'll know before night whether you are really a high-priced man or not."

.....

Schmidt started to work, and all day long, and at regular intervals, was told by the man who stood over him with a watch, "Now pick up a pig and walk. Now sit down and rest. Now walk - now rest," etc. He worked when he was told to work, and rested when he was told to rest, and at half-past five in the afternoon had his 47 tons loaded on the car.³³

Schmidt was rewarded for his obedience by receiving \$1.85 per day (a sixty percent increase) for a three hundred and seventy six percent increase in the amount of work that he did. Soon all the man in that shop were induced to imitate the accomplishments of Schmidt for a similar reward.

The moral of the Schmidt story is that it required a thoroughly unique approach on the part of management. Taylor explains that the

Schmidt experiment shows that

...there is a science of handling pig iron, and further that this science amounts to so much that the man who is suited to handle pig iron cannot possibly understand it, nor even work in accordance with the laws of this science, without the help of those who are over him.³⁴

This became the first principle of the gospel of scientific management according to Taylor:

...in almost all of the mechanical arts the science which underlies each act of each workman is so great and amounts to so much that the workman who is best suited to actually doing the work is incapable of fully understanding this science, without the guidance of those who are working with him or over him.³⁵

Therefore, Taylor continues,

...the management must take over and perform much of the work which is now left to the men; almost every act of the workman should be preceded by one or more preparatory acts of the management which enable him to do his work better and quicker than he otherwise could.³⁶

This was the keynote of Taylor's radical contributions to management.

In the Schmidt experiment, a representative of management was literally standing over the worker directing his every movement. There was a complete separation of planning from performance. In Taylor's system, management was to completely decompose every step in the work and put it back together again in such a way that every detail was planned. Its goal was the complete appropriation of all knowledge that workers had about how to do the work (though Taylor argued that the workers had only a limited understanding) into the possession of management so that management could use it to establish total control over how the work was to be done and how much was to be done. Absolute control of workers'

activities implemented by the systematic analysis of work and its division into discrete tasks was the essence of what Taylor believed was a scientific approach.

Taylor contemplated an analysis, breakdown and control so detailed and thorough-going that it required an entirely new and distinct entity within the plant known as the planning department to coordinate and oversee the work. He wanted to take the knowledge of production techniques and the coordinating of the tasks that comprised the production techniques from the workers and give them to the planning department. The planning department would be the way that management would exercise its control over production. Taylor devised a system of what he called "functional foremanship" in which the activities of the workers were directed, evaluated, and rewarded or punished not by one foreman, but by eight. All eight foremen had different functions under the direction of the planning department: three were to give instructions, four were to evaluate performance specifications in detail, and the last was to give out punishments.

Taylor's system was never implemented in its entirety in any given factory for long. It was too elaborate, took too long to put into full operation, and was initially too expensive because of the careful study that Taylor insisted on making for most employers to accept the whole thing. However, the fact that Taylor's system as he himself conceived of it was not massively adopted by big employers does not diminish its significance. Taylor's personal elaboration of the system of scientific management was merely the most highly articulated expression of the

massive changes that were taking place in the organization of work throughout industry. As the clearest and most refined expression of those changes, it was an overstatement and an exaggeration. Nevertheless, the ideas that Taylor crystalized and focussed and the techniques that he used rapidly became the basis for standard practice of modern labour management. The theory that he elucidated has been incorporated into the modern organization of work in large scale enterprises, in both the public and private sector and in both white collar and blue collar work.

Harry Braverman has called the trend in the organization of work that Taylor was the clearest exponent of "the separation of conception from execution."³⁷ The result of that trend are one of the hallmarks of the modern organization of work. The main difference between Taylor's conception of the way that separation should be operated and the way that it is now applied in current practice is the difference between the order and the rule. Taylor wanted each worker to be issued every day an instruction card from the planning department that would tell him exactly what he was supposed to do. That cumbersome procedure has been modified by the modern corporation or government office into the sleekness of the bureaucratic rule.

There was one more major development in the extension of employer control over the organization of work during the Progressive Era. That is the subject of the next section.

The New Hierarchy in the Workplace

We have seen how the defeat of the Amalgamated Association of Iron, Tin and Steel Workers opened the way to the big employers in the steel industry to reorganize the production process in a way that gave them greater control over it. Some of the first moves they made were to replace the skilled workers with machines. This was clearly observed by Fitch in his study of the steel industry in 1911:

There has been a policy of daring, almost to the point of recklessness, that probably no other industry can duplicate. No change has been overlooked that would put a machine at work in place of a man; thousands of men have been displaced in this way since 1892...³⁸

The result was a collapsing of the skill differentials of workers needed for the production of steel. There were two aspects of that collapse. One aspect is stated succinctly by Fitch:

The percentage of the highly skilled has grown steadily less; and the percentage of the unskilled has steadily increased.³⁹

The decrease in the number of skilled workers necessary was not the only reason for the demise of large differentials in the skill level of workers in the steel industry. The other reason is that with the advance of mechanization, the kind of skill needed was becoming more and more similar from worker to worker. The workers were becoming specialized machine operators. Although they worked on different machines, the kind of skill required to operate them was minimal and it was not greatly different from one machine to the other. The workforce was being homogenized.

The homogenization of the workforce, while solving some problems in the control of the labour force for employers, created others. Homogenization was the result of shattering the limited control over the production process that skilled workers had previously exercised. It is quite clear that it was a major step forward from the employers' point of view in extending their own control over the production process. But it left employers with some new problems. The old hierarchy of the skilled workers, and the organization of production based on that hierarchy, had provided workers with some degree of motivation in their work. They had been to some extent partners in production under the contracting system with the sliding scale of wages. There was also a logical clearly defined path for upward mobility for workers through the hierarchy of skill. That provided another motivation for workers to do a creditable job. Once that hierarchy had been dismantled, that was no longer true. There was nowhere for workers to go, and no way for them to improve their condition except through uniting together and taking collective action to demand better conditions from their employers.

That presented the employers with a serious and long term threat—a threat they had to do something about. Their initial actions to address that problem were in the area of various kinds of incentive pay schemes, as we have seen. It should, however, be noted that incentive pay schemes were first being experimented with before the destruction of the hierarchy of skilled workers. They were seen as a way to deal with unskilled workers before that happened. The point here is that incentive pay schemes achieved a greater usefulness and came into general

use as a way to deal with the effects of the destruction of the hierarchy of skilled workers, although they originated before that.

As we saw in the previous section of this chapter, the premium and bonus wage systems and the differential piece rate systems had two advantageous effects on workers from the employers' point of view. First, they were directly intended to encourage workers to produce more. Second, and more importantly, they had the effect of causing divisions among the workers and destroying their community of interest, which was a thing greatly disliked by managers and owners.

The spread of incentive payment schemes did not solve the great ferment and unrest prevalent among workers around the turn of the century in the United States. Indeed, in a great many cases, it added to that unrest. Workers and their unions of all kinds ranging from the conservative American Federation of Labor to the revolutionary Industrial Workers of the World fought against such schemes. Labor unrest in general was in fact on the increase at that time. Employers counter attacked with a number of ingenious plans which changed the character of industrial society. The rise of what was called "welfare work", whereby big corporations undertook to stabilize their workforce by dangling carrots such as providing improvements in their conditions off the job (a function which has since been largely taken over by government), was one of those plans. The United States Steel Company pioneered in that area. While the workings of company welfare plans, and the welfare plan of U.S. Steel in particular, are fascinating, they too far afield to go into here.⁴⁰ Another of the ingenious plans of the employers was to

recreate a job hierarchy in the workplace. By 1911 when Fitch published his study of the steel industry, he reported that "in every department of mill work there is a more or less rigid line of promotion. Every man is in training for the next position above."⁴¹

This was a very curious development given the similarity of the low level of skill required for the different jobs in the steel mills after the reorganization of the production process following the replacement of skilled workers by masses of semi-skilled machine tenders. The president of Bethlehem Steel Company had stated just nine years earlier that a competent steel melter could be made out of an unexperienced worker in six to eight weeks.⁴² The job of a steel melter was one of the most highly skilled. Obviously there wasn't much to learn in any of the jobs involved in steel making under the new production process. It would seem that the idea of every man being "in training for the next position above" involved some kind of fiction. It did, and it is a fiction which is still maintained today.

If there was little difference between the degree and kind of skills and experience necessary to be able to competently perform a number of different jobs in a given company or plant, then there is no immediately apparent logical reason arising from the work itself why workers should be placed in a progression from one job to the next. But there are some very good reasons from a managerial point of view, and those reasons are similar to the reasons why employers were so enamoured of incentive payment schemes. The existence of a job ladder provided workers with a motivation to do a decent job in the hopes of

being able to progress up it.

The provision of a route of upward mobility was a conscious action on the part of major employers to undercut the kind of restlessness and dissatisfaction of what they called "dead-end jobs" from encouraging labour unrest. In order to provide that route, employers established a hierarchical gradation of the various jobs in their plants and mills in spite of the fact that the level of skill, responsibility and the amount of time and experience necessary to learn the jobs were more or less equal and were not logically cumulative. A textbook written in 1918 by an industrial manager recognized the importance of the way jobs were arranged in relation to one another:

A good deal of literature has been published within the last dozen years in which scathing criticism is made of what has come to be known as "blind alley" or "dead-end" jobs...The work itself is not under attack as much as the lack of incentive and appeal in the scheme of management.⁴³ (Emphasis mine.)

What employers did was to institute a new scheme of management by providing a ladder for their employees to climb. It would undermine the purpose of the ladder if new employees were hired from outside the existing company workforce to fill positions on the upper reaches or even the middle reaches of the ladder. In view of that, it increasingly became company policy to hire from within (except for recruiting management). Fitch noted this practice in U.S. Steel:

If all the rollers in the Homestead plant were to strike tomorrow, the work would go on, and only temporary inconvenience, if any, would be suffered. There would simply be a step up along the line; the tableman would take the rolls, the hooker would manipulate the tables, perhaps one of the shearman's

helpers would take the hooker's position, and somewhere, away down the line, an unskilled yard laborer would be taken to fill the vacancy in the lowest position involving skill. The course would vary in the different styles of mills, as the positions vary in number and character, but the operating principle is everywhere the same...In this way the companies develop and train their own men. They seldom hire a stranger for a position as roller or heater. Thus the work force is pyramided and is held together by the ambition of the men lower down; even a serious break in the ranks adjusts itself all but automatically.⁴⁴

The organization of jobs into a hierarchical ladder also continued and greatly improved upon another advantage that the older system of incentive payments had provided to employers. It continued to invite and encourage workers to improve their conditions and pay individually rather than as a group. And it went further than that: it put workers in direct competition with each other in order to have a better chance of advancement. The importance of that appeal to individualism cannot be underestimated because it was a profound victory over the spreading of the concept of community of interest and class consciousness among workers. The divisive effect of job hierarchies did not go unnoticed by workers, as this excerpt from a manifesto by the founders of the Industrial Workers of the World shows:

Laborers are no longer classified by difference in trade skill, but the employer assigns them according to the machine to which they are attached. These divisions, far from representing differences in skill or interests among the laborers, are imposed by the employers that workers may be pitted against one another and spurred to greater exertion in the shop, and that all resistance to capitalist tyranny may be weakened by artificial distinctions.⁴⁵

The establishment of hierarchical job classification systems provided major support through the structure of everyday experience on the job for the ethic of individualism and the ethic of consumerism which is constructed upon the foundation of individualism.

The existence of promotion hierarchies based on a vertical differentiation of jobs that builds the promise of individual advancement into that hierarchy has become one of the most pervasive aspects of the modern organization of work. Employers derive a number of benefits from promotion hierarchies. They motivate workers to do a good job in the hopes of individual advancement. They encourage employee obedience to on-the-job policies of the employers. They encourage employees to show a "proper" interest in the welfare of the company.

Promotion hierarchies also have the effect of reducing labour turnover and the costs of recruiting a work force. Workers in the second half of the nineteenth century in America were accustomed to a high degree of mobility to move from one employer to another. That was one of the reasons that workers, when they had the power to do so, opposed the implementation of any kind of seniority schemes when they were first devised by employers in the second half of the nineteenth century. Workers then saw such schemes as a limitation on their freedom: they had the effect of binding workers to a single employer, thereby making them more vulnerable to the ill intentions that a particular employer might have. Promotion hierarchies in the end accomplished exactly that: workers learned that their future lay in staying with the company. What represented a reduction in costly labour turnover for management meant

a loss of independence for workers. Once their power to maintain the independence of workers was gone, workers' organization turned to the concept of seniority as a way of ameliorating the worst effects of promotion hierarchies: favouritism by employers which engendered even more obedience and slavishness among employees. Modern unions expend a large amount of effort rationalizing the steps in the promotion hierarchy to which their members are subject and the method by which individual workers are selected to advance through those steps. The job ladder has now come to be regarded as a natural and logical part of reality.

FOOTNOTES TO CHAPTER FIVE

1. Melvin Dubofsky, We Shall Be All: A History of the IWW (New York: The New York Times Book Co., 1969), p. 6.
2. Daniel Nelson, Managers and Workers: Origins of the New Factory System in the United States 1880-1920 (Madison: University of Wisconsin Press, 1975), p. 4.
3. Nelson, p. 4.
4. Dallas W. Smythe, Dependency Road: Communications, Capitalism, Consciousness and Canada (Norwood, New Jersey: Ablex, forthcoming), Chap. 3.
5. See Canadian Dimension December 1979, especially Graham Lowe's "The Rise of Modern Management in Canada," for a discussion of how and when some of the innovations in the organization of work came to Canada.
6. Nelson, p. 37-8.
7. David Montgomery, "Workers' Control of Machine Production in the Nineteenth Century," Labor History 17 (Fall 1976): 487.
8. Nelson, p. 40.
9. John A. Fitch, The Steel Workers (New York: Arno Press, 1969, first pub. 1911), p. 35.
10. Solomon Blum, "Trade-Union Rules in the Building Trades," in Studies in American Trade Unionism, Jacob H. Hollander and George E. Barnett, eds. (New York, Arno Press, 1969; first pub. 1912), p. 306-9.
11. Bruno Ramirez, When Workers Fight: The Politics of Industrial Relations in the Progressive Era 1898-1916 (Westport, Connecticut: Greenwood Press, 1978), p. 88.
12. Catherine Stone, "The Origins of Job Structures in the Steel Industry," Review of Radical Political Economics 6:2 (Summer 1974): 116-7.
13. Stone, p. 118.
14. James Howard Bridge, The Inside History of the Carnegie Steel Company (New York: Aldine Book Co., 1903; reprint ed. New York: Arno Press, 1972), p. 201-2.

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15. Fitch, p. 100.
16. Fitch, p. 102.
17. For detailed accounts of the Homestead strike see: Fitch, Chap. 10; Bridge Chap. 14-6; Milton Meltzer, Bread and Roses: The Struggle of American Labor 1865-1915 (New York: Random House, Vintage Sundial Books, 1973; first pub. 1967), Chap. 13; and Sidney Lens, The Labor Wars: From the Molly Maguires to the Sitdowns (Garden City, New York: Anchor Books, 1974), Chap. 5.
18. Meltzer, p. 144.
19. Fitch, p. 123.
20. Fitch, p. 125-6.
21. Meltzer, p. 142.
22. Meltzer, p. 144-5.
23. Fitch, p. 205.
24. Ramirez, p. 94-5.
25. David Montgomery, "The 'New Unionism' and the Transformation of Workers' Consciousness in America, 1909-22," Journal of Social History 7 (1974): 509-29.
26. Ramirez, p. 95.
27. For an account of the role of the engineer in the development of modern management in the United States, see David F. Noble, America By Design: Science, Technology, and the Rise of Corporate Capitalism (New York: Knopf, 1977).
28. Ramirez, p. 90.
29. Iron Age, 19 May 1910, p. 1190, quoted in Stone, p. 129.
30. Eleventh Special Report of the Commissioner of Labor, Regulation and Restriction of Output (Washington, D.C., 1904), p. 143, quoted in Ramirez, p. 90.
31. National Industrial Conference Board, Systems of Wage Payment, p. 25 quoted in Stone, p. 130-1.

FOOTNOTES TO CHAPTER FIVE CONTINUED

32. Frederick Winslow Taylor, The Principles of Scientific Management (New York: W.W. Norton & Co., 1967; first pub. 1911), p. 11.
33. Taylor, p. 43-6.
34. Taylor, p. 48.
35. Taylor, p. 25.
36. Taylor, p. 25-6.
36. Taylor, p. 25-6.
37. Braverman's Monopoly Capital: The Degradation of Work in the Twentieth Century (New York: Monthly Review Press, 1974) has provided the inspiration for a number of studies of the modern labour process.
38. Fitch, p. 140.
39. Fitch, p. 141.
40. For a thorough description of the welfare policy of U.S. Steel, see Charles A. Gulick, Labor Policy of the United States Steel Corporation (New York: Columbia University Press, 1924). See Fitch for an informative description of the bonus system and the profit-sharing scheme of U.S. Steel.
41. Fitch, p. 141.
42. Stone, p. 133.
43. Meyer Bloomfield, Labor and Compensation (New York: Industrial Extension Institute, 1917), p. 295, quoted in Stone, p. 133.
44. Fitch, p. 141-2.
45. "Manifesto" calling for the formation of the IWW, in Rebel Voices, ed. Joyce L. Kornbluh (Ann Arbor, Mich.: University of Michigan Press, 1964), p. 7.

CHAPTER SIX

CONCLUSION

The organization of work is a social construction that conveys and represents the values and priorities of that society to its members. It can be presumed to have a profound influence on the ways that people think and interact with each other. In modern industrial society, this may be even more true than ever. The time spent at work is of great significance to the majority of the population in modern industrial societies. There are fewer people self-employed or living an agrarian life than ever before, and the number is getting smaller. There are more women in the workforce and for lengthier periods than ever before. The experience of working for one's living in the employ of someone else is a great common denominator. The organization of work is, along with a few other social constructions such as the family and the educational system, one of the basic social arrangements of human life. As such it is one of the basic communication systems in society, although its primary purpose is not communication.

The workplace, as any other of the structures of everyday life, is a system in which messages circulate. And as in any other communication system, messages do not circulate in a random or haphazard manner, but observe rules and patterns which are a reflection of the way the system has been organized. Those rules and patterns, as well as the content of the messages whose circulation is controlled by them, are themselves reflections of the relations of power that obtain in the

larger social and economic context of which the workplace is a part. The organization of work, through its implicit rules governing the formation and circulation of messages in social interaction in such a universal and basic sphere of life, cannot help but have a significant impact on the formation of consciousness and the perception of reality.

The modern capitalist organization of work is a model of hierarchical communication. Today in management magazines, it is common to find articles with titles such as "Issues in Upward Communication," "Opening the Channels of Upward Communication," and "Mastering the Techniques of Two-Way Communication." One of those articles contains a description by a former vice president and area general manager for New England Telephone that gives an indication of how even management recognizes the hierarchical communication of the workplace and sees it as somewhat of a problem:

Communications in a hierarchical society or organization work according to the principle that governs gravity. Downward communications are usually better than anyone realizes and frequently more accurate than those at higher levels want them to be. Conversely, upward communications have to be pumped and piped, with a minimum of filters, in order to be effective.¹

This thesis has attempted to examine how this kind of situation came to be in the workplace, without resorting to a general principle like gravity. It has been argued that the hierarchical structure of the communication process inherent in the modern organization of work has been formed by the political economy of the society of which it is a part. Productive activity in our society is carried on through the purchase of labour power by those with the means to make use of the labour and time of

workers. Once an employer has secured the services of an employee, the central problem becomes how to get his money's worth. The employer has purchased the potential for getting work performed on his behalf, and he must endeavor to translate that potential into as great a quantity as he can. The quantity that the potential will be transformed into depends on several things, not the least of which is the subjective efforts and willingness of the worker. It is in the interest of the employer to secure the employee's greatest efforts, but it is not necessarily in the interest of the employee to provide his best efforts. The search for a solution to the problem of how to secure the maximum efforts of hired employees has had a primary influence on the development of the modern organization of work. The managerial need to control the behaviour of the worker on the job so as to guarantee that the worker will maximize his output for the employer has played a major role in shaping the communication structure of the workplace.

This thesis has traced the steps in the historical process that led to the most significant manifestations of control in the modern capitalist organization of work and the everyday communication system that it constitutes. We have seen that the appearance of the most fundamental and outstanding characteristics took place during two periods. Changes in the organization of work were integral to the profound transformations in the economic structure that were occurring at those two times. Those two periods were the Industrial Revolution in England and the turn of the century in the United States.

We saw during the Industrial Revolution the beginnings of the centralized work location, an employer enunciated and enforced discipline in the centralized work location, the detail division of labour and the accelerated use of machinery, and we saw how those developments were related to the need of employers to increase their ability to control the working behaviour of their workforce. During the period around the turn of the century in the United States, we say the deliberate deskilling of workers through a reorganization of production processes based on the increasing use of machinery by employers who wanted to be free of the limited form of workers' control over production processes that their skill in production gave them. We also saw the rationalization of lines of authority in the organization of work by an extension of direct managerial analysis and control over the work process through the techniques that scientific management clarified. And we saw the deliberate building into the organization of work of incentives appealing to individualism through the creation of promotion hierarchies. In both periods the utilization of new machinery did not play an independent determining role. The invention and introduction of machines in production as well as the elaboration and extension of the division of labour are seen as inter-dependent parts of a single story whose unfolding responded to the requirements of the logic of the capitalist economic system. Both were the result of the enlistment of science in the service of capital.

The systematic enlistment of science in the service of capital has meant the appropriation for the production of knowledge relevant to the workplace by employers, and the removal from workers of the right to

possess and utilize independently traditional knowledge. Many of the conflicts discussed in this work have in effect been over knowledge, whether the participants were aware of it or not (though they were aware in many cases). The systematic appropriation of knowledge about work and the workplace is a process that continues to be applied to each new generation of workers, as Braverman indicates in his discussion of clerical workers.²

The modern organization of work as we now recognize it can be understood as pre-ordained, non-political, logical and natural only if the managerial necessities of the economic system are accepted as pre-ordained, non-political, logical, natural and inalterable. There have been at various times movements of workers that challenged that idea, some more directly and clearly than others. The Industrial Workers of the World was one such movement that contemplated a thorough reorganization of industry under the control of workers and recommended direct action by workers as the way to accomplish that. Since its demise, widespread and well defined movements of workers directly challenging the conception of the managerial necessities of the economic system as pre-ordained, non-political, logical, natural and inalterable have not been popular. Marx had an insight into that over a hundred years ago:

The advance of capitalist production develops a working-class, which by education, training, habit, looks upon the conditions of that mode of production as self-evident laws of Nature. The organization of the capitalist process of production, once fully developed, breaks down all resistance.³

It is of course an exaggeration to say that all resistance is broken down. There are symptoms of disaffection with the way that work is organized in spite of the revailing attitude that the present organi-

zation of work is inevitable. Those symptoms of disaffection such as high rates of turnover, absenteeism, boredom, etc., are noteworthy in that they are acts of individual resistance and rebellion. It is perhaps one of the crowning achievements of the way work has been organized in the interests of employers that any resistance to it takes for the most part a fragmented individualized form. Not only does that greatly weaken the force of any resistance, but it also provides fertile ground for the runaway consumerism which has become a cornerstone of western industrial countries.

The managerial needs of employers arising from the conflict of interest between employers and employees have established the nature of the workplace communication system. In earlier times, working people had a greater degree of freedom to communicate among themselves about their workday activities and about how the work was to be done. The expansion of managerial control over workers through the reorganization of work established a communication network that is hierarchical in the sense that it discourages the existence of self-managed interaction within groups of workers. The logic of the modern organization of work subverts the ability of workers to determine their own activities, and subjects them to a higher authority that manages their activities for them. In establishing the domain of its authority, management has devised a structure that reserves the right to initiate significant communication in the workplace to itself.

That raises questions about the ideals that a democratic society sets for itself. Our society is one in which workers are

also citizens expected to take part in and believe in the rights and freedoms they are told are theirs. Yet the hierarchical structure of unfreedom and the generally totalitarian structure of the organization of work do not encourage the belief in and participation in those rights and freedoms.

FOOTNOTES TO CHAPTER SIX

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2. Braverman, p. 293-358.
3. Marx, p. 689.

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