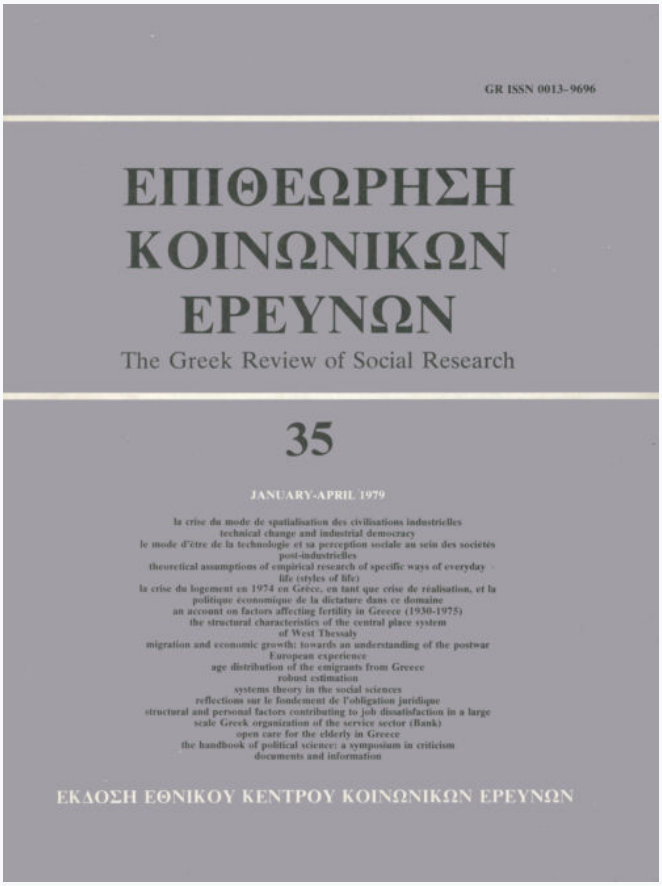
ePublishing

ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΤΕΚΜΗΡΙΩΣΗΣ
EKT NATIONAL DOCUMENTATION CENTRE

The Greek Review of Social Research

Vol 35 (1979)

35



Technical change and industrial democracy

Rudi Schmiede

doi: 10.12681/grsr.161

Copyright © 1979, Rudi Schmiede

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0.

To cite this article:

Schmiede, R. (1979). Technical change and industrial democracy. *The Greek Review of Social Research*, *35*, 12–32. https://doi.org/10.12681/grsr.161

https://epublishing.ekt.gr | **e-Publisher:** EKT | **Downloaded at:** 23/04/2024 16:28:08

technical change and industrial democracy

by
Dr. Rudi Schmiede

Translated by James Wickham

The present paper was delivered to an international conference on Industrial Democracy, organized by the SSRC Industrial Relations Research Unit of the University of Warwick, at Cambridge in July 1977 and first published by the organizer in a conference report «Industrial Democracy: International Views» in 1978.

To investigate the relationship between technical change and industrial democracy is the same as investigating the relationship between technical change and domination, for within political theory the concept of democracy denotes a specific form of domination. Democratic rule is seen as necessary by those affected by it and is socially legitimated by a generalized definition of its form and content. In this paper I have to discuss the nature of democracy only in so far as it relates to the developmental trends of technology and of the work process. The literature on these issues derives from disparate areas of the social sciences—social philosophy, political economy, the sciences of work and organization, industrial and factory sociology. The consequence of this wide range of disciplines is that in each case the concepts of domination and of industrial democracy which are applied vary widely in their content and in their extent.

Nonetheless, I consider that it is possible to distinguish between two basic conceptions of industrial democracy, each of which forms the basis of two different approaches to the problem. The first approach aims at a qualified form of participation of representatives of the dependent employees in all levels of economic decision making processes—from co-determination at the workplace up to trade union participation in economically relevant institutions. Implicitly or explicitly, this perspective—which I would like to characterize as the «economic democracy» conception of industrial democracy—assumes that no basic structural changes need to be made in the existing capitalist mode of production in order to secure for the wage dependent population a level of consultation which is broad enough for their interests to be realized.

By contrast the other version—which could be called the *«socialist» conception* of industrial democracy— sees the interests of the working population as only being secured through an extensive self-determination of the masses over social production and reproduction. Here the aim is less the social legitimation of what is held to be necessary domination, but rather its abolition. In this conception, therefore, basic changes in the relations of production are seen as the precondition for the self-determination of the producers, and it is from this standpoint that the specific changes in the labour process are assessed.

The distinction between the two conceptions of industrial democracy is important because theories of the labour process and real developmental tendencies in the labour process have a differing relevance for each of the two conceptions, and each position assesses these theories and changes differently.

At this initial stage I should also point out that democracy and employee self-determination are de-

fined within several very different dimensions. One dimension refers to characteristics of the immediate work situation such as qualification, the possibilities of different work arrangements, autonomous work, proportion of mental labour, etc.; a second dimension covers elements of the whole production process of a department or of a factory such as type of technology, forms of work organization, hierarchical structure, co-operation, etc.; finally, a third dimension includes the basic parameters of production such as the aims of production, the question of growth or of the relative proportion of different sectors and thus extends to the level of society as a whole. The «economic democracy» conception of industrial democracy tends towards a restrictive definition of the dimensions involved, while, given its own claims, the socialist version necessarily includes all these dimensions in its understanding of industrial democracy.

My general thesis on my topic is that in material production the developmental tendencies—in economics, technology and work organization—are working towards a sharper class polarization and therefore threaten to remove the real basis of the economic democracy form of industrial democracy. Consequently, at least for a part of those affected, the socialist version will become increasingly more important as the subject of discussion, controversy and social conflict. This does not alter the fact that up to now this form of social organization is much less clearly defined and still requires the solution of basic problems.

To explain these theses I would like to firstly recall in typological form the relevant theoretical approaches for locating the relationship between technological change on the one hand and domination or autonomy on the other; this will be followed by a critique of these approaches; in the third part of the papers I will present theoretical arguments and research results from our institute's work; finally, this will enable some specific statements on the conditions of and the barriers to industrial democracy.

1. relevant interpretations of the relationship between technology, domination, and work autonomy

In the discussions of the last 25 years there are two basic positions on the relationship between technological development and work organization. The first starts from the assumption that technological development relatively closely determines changes in work organization and with this the possible levels of autonomy and of democracy (and thereby the necessary amount of domination). What within this framework is seen as the increasing preponderance of technically determined objective rules instead of personal domination leads either to a pessimistic assessment of the possibilities of industrial democracy—the thesis of increasing technocratic tendencies—or to an optimistic one—the thesis of increasing worker self-determination within given technological conditions. The other position treats work organization and consequently also the possible social action of the participants as relatively independent of technological development: technological development here is treated as an external condition of social action relatively neutral in relation to interests and domination. Consequently, this position presents the possibility of humanizing work conditions and work processes and of achieving democratic decision-making structures within the factory as to a great extent independent of the given technology.

In the West German literature (e.g. Fricke 1975, 1976) the first position is discussed as the *technological* explanation of developmental trends in industrial work. The more pessimistic variant of this approach is based on certain social philosophical and anthropological assumptions and can be seen as the *technocracy thesis* applied to industrial organization. In the German discussion this is associated with the writers Gehlen, Freyer and Schelsky.

Arnold Gehlen (1957) explains the necessity of technology by man's limited organic abilities—his «organic inadequacies». Through the principles of «organ substitution», «organ adjustment», «organ relief» and «organ cut-out» technical means operate to extend the limits placed on man by his organic structure. The success of inorganic technology ensures that it rapidly gains predominance, while its success in turn has to be explained by the historical coincidence of specific technical developments, the practical and experimental orientation of the natural sciences and the capitalist mode of production. At the same time the dominance of technology is linked to deep-seated human needs: according to Gehlen's basic anthropological assumptions man, with his relative lack of instincts, admires the instinctually fixed completeness and security of the animal's behaviour—with a sort of primaeval longing man desires for himself this security and completeness. Technology achieves for man the «uniformity of the natural process» and stabilizes for him the rhythm of the world (Gehlen considers man himself to be subordinated to rhythmic automata). Through this «instinctual drive» technology connects man to rhythmic external processes subject to their own dynamics; it is this «instinctual drive» which is the «motor component» of technology. According to Gehlen, therefore, technology can in no way be seen as merely a set of rational means, but rather it is part of the «law of existence» that man expands his power

over nature—technology is located within man's own psychic structure. Gehlen criticizes transfering natural science principles to social and interpersonal areas as allowing the atrophy of human individuality. Further, according to him, such a transfer also changes institutions based on personal qualities into organizations functioning according to technical principles. Despite the high level of rationality of these organizations, collapse into the barbarism of dehumanization can only be avoided if man withdraws as an individual from «industrial society» and with a «ukase» dedicates himself to the two poles of the process—to the desire for knowledge at the beginning and the desire for consumption at the end.

Hans Freyer (1960, 1970), who in his basic position agrees with Gehlen, stresses the «obligatory character of technology» in a more radical way. While Gehlen protests against the transfer of technical principles to non-technical areas of human life, for Freyer this process is in fact so far advanced and is of such an irreversible character that it can no longer be the subject of debate. Freyer supports his argument through a discussion of the notion of progress: in the Enlightenment of the 18th century progress was not thought of in terms of the completeness of technical apparatus but in terms of the «enlightenment of minds», as the «ennobling of morals», i.e. as the «triumph of the idea of freedom and equality» (1960, 133). With the domination of the industrial form of life, in which «the better is the enemy of the good» (1960, 134), the dominant form of thought is one which is orientated towards the objective technical development and defined in terms of its effectivity. This involves a basic change in the structure of technology itself—from a closed end-means relation to an open and indeterminate means-relation: «From this point on the central purpose of technology becomes to make power available for indeterminate ends... The meaning of technology is not any longer use (which is always use for something or to something), but rather power, which is, in the words of Max Weber, essentially amorphous. In this way the technical mind is made absolute—it is released from having to follow any pre-given goals» (1960, 139). Freyer's conclusion is the same as Gehlen's: the human personality can only be rescued from the imperialism of technical rationality by individual opposition.

Finally Helmut Schelsky (1961) investigates the consequences for the origin and development of domination of a universalization of technical rationality (the technology of the production of goods is followed by organizational and psychic technologies). While Schelsky accepts Gehlen's principles of organ relief and «organ extension» as the original motivation for technology, he sees the decisive characteristic of the technological world in the domination of a form of consciousness which analyzes the world in order to produce new syntheses. Science as technique, analyzing, systematically perceiving and constructing, creates for itself a new world, a «second reality», on which however man becomes ever more dependent.

For Schelsky, the theory that technology dominates man is accordingly false: technology is not something external to man, but rather is «man himself as science and work... man is subordinated to the constraints which he himself produces as his world and as his being...» (1961, 18). In this newly created scientific and technological civilization therefore, «a new basic relationship of man to man is created... relationships of domination are no longer a personal power relation between people; instead of political norms and laws there develop objective rules... which cannot be produced as political decisions and which cannot be understood as norms of ideology or belief» (1962, 21-22). Schelsky relates the consequences of this development primarily to the question of political domination in the state (since technology is the self-produced life-form of humanity it requires no legitimation: with the dominance of objective laws in the social process the basis of democracy disappears, for political decisions are only necessary when technique and technical knowledge are incomplete). However, Schelsky sees such consequences as also manifested in the development of the industrial area. According to him, industrial sociology studies have proved without any doubt that objective discipline replaces the (personally mediated) discipline of domination, that «the rationality of the apparatuses and the machines becomes continually clearer to the worker and their technical requirements can be perceived by the worker as directly social requirements» (1961, 27). Thus, the workers more and more accept the «general law of civilization»; «that so to speak, the means determine the ends, or better, that technical possibilities enforce their utilization» (1961, 25). «This circle of self-determining production comprises the inner law of scientific civilization» (1961, 16). Schelsky considers the solution to the problem to be a «permanent reflection» by those affected by this process on «the meaning of humanity».

These anthropological and social philosophical justifications for the autonomy of technological development and the social dominance of a technico-scientific effectivity criterion have been outlined here in some detail because I consider that an implicit version of them forms the basis of much of the conventional discussion in organizational and industrial sociology, even if it is never made explicit. Hierarchy, domination and norm-controlled role behaviour in complex organizations (which are considered to

today encompass almost all areas of social life) are in most accounts treated as being inevitable. The justification for this is the argument that the expansion of complex organizations makes it impossible for the stability and uniformity of the processes involved to be secured by co-operation that is based on the needs and interests of the participants: consequently, given «effectiveness» as the basic aim of the organization, the formation of a structure of authority and domination is unavoidable (cf. as representative of many others, Katz & Kahn, 1966, 77-79).

In a similar way, the concentration of modern (functionalist) system theory on problems of controlling and structuring organizations derives from this same basic assumption: effectiveness is understood as independent of any specific goal and its achievement makes domination inevitable. Ullrich (1977, 16) concludes a survey of explanations of domination with the assessment that «the overwhelming majority of all industrial sociologists start from the assumption—if with partially different justifications—that domination is a necessary and central component of all production organizations». That for the theorists discussed so far the basic solution is a strategy of retreat to the individual personality has made clear what is in fact central to this entire approach: autonomy or freedom as the basis of industrial democracy (in the sense of the free determination of the participants over their social action) is only possible outside this organized area of life; within the organizations relationships of domination which are seen as socially necessary prevail.

The *consequence of the technocracy thesis* for the possibility of industrial democracy becomes especially clear in Schelsky's arguments: the domination of the objective constraints of scientific and technological civilization removes the basis of democracy as a political form of decision-making, for the political area is increasingly eliminated from the central areas of human activity. Against the rationality incorporated in technology and organization there is no justification for either form of industrial democracy: no explicitly political decision is needed for subordination to the rationality which men themselves have produced, only the insight that the objective laws are an objectification of one's own reason.

This first variant of the technological approach justifies domination as objectively inevitable—it, therefore, rejects freedom and democracy. By contrast, another variant, which could be called the *technological autonomy thesis,* argues that the development of modern technology is itself producing larger areas of autonomy and hence more areas in which the participants are self-determined and able to overcome their alienation. Robert Blauner (1964) in his account based on the three phase model of industrial development sees the phase of semi-automatic production as displacing work requirements from manual skills to increasing responsibility. From this he claims to be able to find a tendency towards the abolition of workers' alienation. West German writers have based their prognosis of increasing work autonomy primarily on the nature of workers' co-operation as technology changes. Thus, Heinrich Popitz, Hans Paul Bahrdt et al. (1957 a and b) in their studies of the steel industry find an increasing objectification of the work organization, similar to that stressed by Gehlen. On less developed technical equipment co-operation occurs in «team» fashion (i.e. the workers work together with similar activities to solve a task), while the wide possibility of independent work ensures that orders and control are personally mediated through superiors. However, on more modern equipment co-operation is much more strongly mediated through technology itself. Co-operation is now «structured»: the workers co-operate with each other through the machine structure and it is this which basically determines the type and content of their co-operation. In this situation personal control is reduced in favour of the «rationality of the technical equipment, the machine or the apparatus». This logic now becomes concretized, it no longer appears to be arbitrary as does compulsion by man over man, and it demands from the worker a new «technical sensibility». Consequently, given that work tasks are increasingly allocated to specific workers, it is possible to assume an «increasing responsibility of the individual worker»; since the completion of the work task requires «technical intelligence», at the same time abilities become increasingly similar. Popitz et al. formulate their conclusions cautiously: certainly this development «cannot be seen as a transformation of social relations and their accompanying ideologies», but nonetheless the formation in each individual worker of technical ability as the precondition for production occurring does provide a new basis of social recognition, one which cuts right across the differentiating norms of bourgeois society which are based on other criteria. In this Popitz et al. see an acceptance of technical realities and something that is at least a necessary precondition for society being able to deal with technology (1957 a, 207-214).

This rather restrained conclusion is developed by Bahrdt (1958) in a work on «industrial bureaucracy» based on these earlier studies. Bahrdt argues that technological change leads to horizontal forms of co-operation such as occur above all in «structured» type work processes (as examples he cites in addition to office work, conveyor belt assembly in the motor industry, transport undertakings, energy production works and the chemical industry); these technically

determined forms of co-operation come into conflict with the hierarchical organization of the enterprise. As a result hierarchy is reduced within the labour process, the «tendency towards de-hierarchialization» creates a certain independence for the subordinate positions and work places develop «at which the employee can carry out work which is responsible and not uninteresting in relative freedom» (1958, 35-36).

In England as far as I can judge Joan Woodward (1958, 220-221) has put forward a similar argument in regard to the different work organizations and work situations in «large batch and mass production» on the one hand, and «process production» on the other hand: «As technology advances the entire concept of authority in industry may have to change. In process firms the relationship between superior and subordinate was much more like that between a travel agent and his clients than that between a foreman and operators in mass production.» The workers voluntarily accept the requirements of the work place, such as for example time keeping or necessary preparatory works, and, like their superiors, gain more job satisfaction from this work situation: «From the operator's point of view, too, it would appear that the relaxation of pressure and the higher quality of relationships between supervisor and subordinates will more than compensate for an increased monotony and boredom arising from monitoring occupations.» Similarly, Burns and Stalker (1961) consider that in the conditions of a modern economy subject to rapid technological change the more suitable form of enterprise organization is an «organic» system characterized by horizontal co-operation rather than by bureaucracy and hierarchy (in the «mechanistic» system).

The theses of Popitz, Bahrdt et al. were taken up and further developed in several studies on «work force co-operation» (K. Frielinghaus, 1957; K. Frielinghaus & G. Hillmann, 1963; G. Hillmann, 1965). These studies, together with some additional arguments, were important in the trade union debate over the development of the work process and also played a part in the trade union calls for a «humanization of work» in the 1970's. Here a further argument in favour of the replacement of interpersonal domination by horizontal and structured type co-operation emerged: it was argued that, compared to the traditional enterprise organization, horizontal forms of co-operation were both more productive and more functionally suitable for the factually horizontal connection between the work processes. This argument, one which was frequently cited to support humanization measures, makes the dismantling of hierarchy and domination dependent on the criteria of the productivity and functionality of co-operative organizational forms. Further, these authors demand «co-operation determined by the work force itself» going beyond the technical structure; this new co-operation takes account of the fact that the allocation of work in the enterprise is also subject to continuous technological change. Since it creates the possibility for creative initiative by the work force itself, it opens up the potential of a new and independent productive force to which the learning experiences of experienced work teams contribute. This productive contribution of the workers, so it is argued, also legitimates the employees' claim for participation in all important decisions of the enterprise.

In a still more sweeping form Serge Mallet (1963) interprets the attributes of highly qualified workers in modern automated factories—a high level of work autonomy, enlarged chances of control, horizontal forms of co-operation and an extensive overview of the whole production process—as conditions for the constitution of a «nouvelle classe ouvrière». Because of its position this class is more able to recognize the imposed character of capitalist work organization and hence it is a potential carrier of anti-capitalist structural reforms.

Studies on the relationship between the level of mechanization and the wage form (Lutz & Willener, 1960; Lutz et al., 1962) were seen as confirming the claimed link between technological development and the growing possibilities for industrial democracy. Their results appeared to show that as the production process becomes less open to influence by the workers, the incentive wage systems enter into crisis and are replaced by a wages system based on participation in the productivity of the whole enterprise.

The *consequence of the technological autonomy thesis* for the chances of industrial democracy can be formulated as follows: as a necessary result of the changes in technology and co-operation, elements of industrial democracy begin to dominate above all in the immediate work situation. However, such elements also effect the structure of the overall enterprise and there, too, contribute to overcoming aspects of work alienation (such as hierarchy and personal authority); from these developments it is possible to deduce the demand for industrial democracy at the level of the society as a whole (participation in the growth of productivity in the overall economy), or even to argue that such a tendency already actually exists (a new producers' consciousness amongst workers in automated production). All in all then this process is seen as producing objective and subjective impulses towards the realization of the economic democracy type of industrial democracy. For the more wide reaching perspective of the socialist variant of industrial democracy these changes in the work process only offer a possible starting point in

the form of a new consciousness based on alternative forms and alternative aims of production.

The technological autonomy thesis as developed in sociological studies between 1955 and 1965 has since been fundamentally challenged by the praxis of new forms of the division of labour, new methods of work organization and new performance based wage systems. In the scientific discussion it has been primarily opposed by the results of research and discussion on automation. Above all the study by Bright (1959) should be mentioned here, which by differentiating the characteristic requirements of modern industrial work (by criteria such as physical stress, psychological stress, dexterity, knowledge and ability, education, experience, responsibility, etc.) argues that despite differential development in time a general tendency towards simplification of work content and requirements can be observed, that workers become increasingly interchangeable and ever more indifferent to the actual production they are engaged in. The best known work in industrial sociology in West Germany for the last 15 years (Kern & Schumann, 1970) comes to similar conclusions. According to Kern & Schumann, technological change leads to qualified forms of automation work with high opportunities for control, low stress and good contact possibilities, for only a minority of work places, while semi-automation leads to the growth of a multitude of new manual or repetitive and fragmented jobs. As a whole, it is this type of work which predominates in industry (1970, Vol. 1, 139-140). To a varying extent, in all branches of industrial production a polarization of tasks and qualification requirements can be found (1970, Vol. 1, 162-165).

These results mediate between representatives of the technocracy thesis and the adherents of the technological autonomy thesis, but they were also interpreted as confirmation (or at least as stimulation) by theorists from a very different position. For such writers the works of Bright, Kern and Schumann and others at least did not disprove their own thesis that no or only a small connection exists between technological change and work organization (thesis of the neutrality of technology). This thesis is based on two fundamental assumptions: (1) technology and its development are themselves conditions of social action which are largely neutral with regard to interests and domination; (2) technology understood in this fashion does not predetermine in any definitive way the types of work organization and co-operation in which work is carried out.

The first assumption has been formulated particularly clearly by Jürgen Habermas (1968). Habermas sees technology and production as a «sub-system of zweck-rational action» within a total social system. The system involves not only the zweck-rational sphere of work (to which must be counted the modern natural and technological sciences), but also the sphere of communicative action in the form of «symbolically mediated interaction». His argument (following Gehlen) then is that technology can only be reconstructed as «'a project' of humanity as a whole», as history «from the point of view of the gradual objectification of zweck-rational action». Technological development follows a logic «which corresponds to the structure of that type of action which is zweck-rational and controlled by the extent of its success, i.e. to work itself». As long as this is the case, i.e. «as long as the organization of human nature does not alter, as long, therefore, as we must maintain our life by social labour and with the help of means which substitute for labour», it is impossible to see how «we could ever be able to give up technology, and indeed *our* technology, for a qualitatively different one». For there is no sign of any alternative model of technology (1968, 55-57). A social alternative for Habermas, therefore, does not lie in a new technology or in a new science, but in an alternative structure of social action—in symbolically mediated interaction which aims at individualization, emancipation and the expansion of domination-free communication. With these formulations Habermas criticizes the arguments of Herbert Marcuse (1967), for although Marcuse in general discusses the relation of technology and domination in a rather contradictory way, he does insist that the the one-dimensionality of the formal logic which first enabled the technological development of the last two centuries involves a necessary and immanent link between technology and domination (cf. 1967, 159 ff.). For Marcuse this does not suggest an alternative application of technology, but rather that the link between technology and domination is actually a structural characteristic of technology itself. «Not in its application but in itself is technology domination (over people and over nature): methodical, scientific, calculated and calculating domination. Specific aims and specific interests of domination are not imposed on technology from outside and after the event—instead they enter into the construction of the technical apparatus itself» (Marcuse 1965, 179). By contrast, Habermas sees in the transformation of social forms of communication and in the resultant alternative application of technology the strarting point for a transformation of the social functioning of technology (1968, 98-99).

At this point it is worth noting that this position is one that Habermas shares with the overwhelming majority of recent marxists (although incidentally not with Marx himself). The conception of technology in Lenin's theory of revolution is based on his understanding of capitalism in his theory of imperialism

and behind that, on the work of Hilferding. Here Lenin's theory and the bulk of its successors all have in common that they see the transformation of the relations of domination of capitalism as solely a political question. While the socialist society is understood as an alternative system of political control —council or soviet democracy as the basis of workers' government in the form of the dictatorship of the proletariat; through this the centralized organization and control of the economy — notions of a qualitatively different form of economy, are completely absent. I will return to this point later, for the problem of the objective conditions for a socialist society and the problem of the objective conditions for industrial democracy are closely related to each other.

The second assumption (i.e. that technology and work organization are only loosely linked to each other) can be found primarily in theories of organizational and industrial sociology. An early example of the argument which could be cited here is the so-called «socio-technical» approach of the London Tavistock Institute. Trist and Bamforth (1951) attempt to show that with a given technological procedure (in their study, the «longwall method of coal getting») it is possible to have different forms of work organization which in turn have different effects on workers' qualifications, job satisfaction and work autonomy. Thus, the researchers proposed breaking up the existing three shift system (in which each shift had clearly defined tasks) into smaller work groups, so ensuring an independent work motivation and avoiding tensions in co-operation and in the division of labour. However, in fact this «composite longwall method» which they put forward did not involve a changed technology at all, but merely the adaptation (from the point of view of increased effectiveness and profitability) of the work organization to the existing technology: productivity was increased, absenteeism and the frequency of accidents were reduced and work satisfaction raised. As the authors say, the aim of the measures was «the full and continuous realization of their (the factories') technological potentialities» (1951, 362). All the same, in the Institute's more recent publications it is stressed that the production technology limits the area of possible organizational changes in work. Consequently, variations of technology are utilized in order to optimize the system as a whole and it is argued that the main weakness of the traditional human relations concept was its neglect of the technological dimension. From this position then, new forms of work organization and the achievement of industrial democracy are seen as complementary strategies (Emery, 1967; Trist, 1968; Emery & Trist, 1969; Emery & Thorsrud, 1969).

Recent West German studies assert in a more radical way that the relationship between technology and work organization is becoming looser and go on to draw political conclusions. Thus, Lutz (1968) deduces from the fact of «the growing technological autonomy of the production process... which requires less and less human intervention» (1968, 244) the thesis, that «human action in work... is less and less subject to technological constraints». Hence, he argues, co-operation relationships become increasingly indeterminate and «can no longer be explained merely by the level of technology alone» for they are «shaped by specifically social conditions». Further, «in this situation the information needs of all employees tend to grow» and cannot any more be concentrated in a hierarchically superior minority, but must instead be «transformed.. into horizontal, multilateral and functional co-operation» — the value of specific and rigid regulations declines in favour of an enlarged margin for logical analysis and rapid decision-making by the employees themselves (1968, 246-247).

On the basis of this argument Fricke (1975, 1976) demands what he calls a «dynamically orientated industrial sociology» approach — one which will investigate «possibilities» of alternative forms of work. The objective of this type of study should be to promote the organization of work by the employees themselves from the point of view of their own interests, while employee co-determination should not be understood as being restricted to the work place, but as extending to the level of the enterprise or even to aspects of the whole society. For Fricke the fact that such «possibility analysis» has not yet been carried out is the result of the narrow perspective of industrial sociology: «Once theory and research in industrial sociology stop studying enterprise phenomena such as work organization, job content, forms of enterprise decision-making and co-operation processes, the hierarchical organization of the enterprise etc., solely from the point of view of technological functionality or economic profitability, then alternatives to the existing structures become visible, opening up realistic chances for social action in industrial enterprises» (1975, 20). Such a «dynamic» analysis would have to study different possibilities for combining tasks into jobs, possible alternative forms of work organization and the chances of autonomously planning the work organization; it would investigate the subjective potential for organizational innovation and not only how existing qualifications could be better used and expanded in the work process, but also how new qualifications could be acquired by employees. Fricke's approach depends on a concept of «occupational autonomy» where the work process is understood as at least potentially an educational and learning process, and

where the aim is to realize this potential. A study by Fricke himself in the coal-mining industry (which however was restricted to pit-foremen, i.e. to middle management) is claimed to have shown that wide differences in work organization co-exist with the same technical processes. Equally, both the literature and the praxis of informal co-operation suggest the existence of at least partially non-hierarchical structures, and in the case of the pit-foremen, too, a considerable innovation potential was found. In many cases the attempt to realize alternative forms of work organization in no way involved questions of power — increasing the work autonomy of one group could increase that of other groups at the same time. Further, Fricke argues, given newly formulated social expectations, the forms of economic rationality are now also subject to change. Fricke sees «the achievement of occupational autonomy in the work process as a necessary supplement to representative forms of co-determination» (1975, 45): codetermination and «occupational autonomy» are, therefore, for him complementary strategies.

All the same, a large part of this approach is still only programmatic. Certainly in the pit-foremen study Fricke et al. found possible alternative forms of work, but they found few examples of the autonomous social organization of work and none at all of innovatory action; consequently existing «objective» possibilities for change could not be realized. These results lead him to argue that in the case of contentless and repetitive fragmented jobs with a high division of labour, innovatory action is completely impossible unless the division of labour and the organization of work are altered first (1975, 205-208). Fricke appeals to the models of «system management» practised in the USA and to the experiments in British and Norwegian enterprises based on the socio-technical approach of the Tavistock Institute (Emery, 1967). He sees such attempts at the «humanization of work» as a precondition and a necessary part of an «industrial democracy programme», but criticizes them for underestimating the innovatory potential of employees and hence neglecting the necessity of employees acquiring supplementary qualifications. Programmes such as these are successful when they increase work autonomy, reduce the hierarchical division of labour and improve employee participation in enterprise decisions (1975, 236-237).

The *thesis of the neutrality of technology* can now be seen to have clear *consequences* for any assessment of the conditions for and chances of industrial democracy. Since technology itself is seen as unspecific in regard to interests and domination and its social character has to be seen as lying in its actual application, then the organization and achievement of industrial democracy must be chiefly a question of political will. The possibilities for such a political choice, so it is argued, are now growing as production technology becomes more autonomous—even when technology and work organization have to be altered to achieve industrial democracy, this can be done without any loss in profit and effectiveness. These improved chances and conditions for industrial democracy chiefly involve improvements in the immediate work situation, but they also include changes in co-operation units such as work groups or departments. Although the conditions for an economic democracy form of industrial democracy are improving, the possibility of actually achieving it depends above all on subjective dimensions—on the wage earners' consciousness, programme and determination. As for the socialist variant of industrial democracy, these arguments have no consequences for it, since the processes described here do not extend to the level of the overall society.

2. a critique of theories of technology, domination and work autonomy

At this stage I would like to firstly advance some critical points on the theoretical bases of the arguments that have been discussed so far; this will allow clarification of some central problems which will be discussed in the next two sections of the paper.

In all the approaches introduced here the relationship between technology, work organization and the laws of capitalist production remains vague or undiscussed. This indeterminacy is accompanied by a very broad concept of technology which does not grasp the differentiae specificae of capitalist technology. Thus, Gehlen's «physiological» conceptualization of technology as the expansion of humanity's physical organic abilities applies equally to the first tools of stone age man and to the use of the conveyor belt as a means of transport. On this point the criticism made by Freyer and by Schelsky has to be accepted—the structure of technology has changed from a closed end-means relationship to an open means relationship and the decisive characteristic of this new structure is its organization according to the analytical-synthetic procedures of the modern natural sciences. Nonetheless, the domination of these structures is left unexplained—both by the reference (which derives from Max Weber's concept of rationalization) to their rationality and by the use of the pragmatic criterion of their effectiveness. Such arguments cannot provide an adequate explanation because they ignore that the domination of capitalist industrial technology meant for the vast majority of those affected by it (i.e. the mass of wage earners) domination—with all its consequences of dequalifica-

tion, abolition of work autonomy, separation from the mental powers of labour and the destruction of existing forms of co-operation. All the same, these social philosophy orientated theorists do nonetheless describe the results of the results of the dominance of science and technology relatively aptly (if in individualistic terms) as depersonalization, abolition of freedom, removal of the basis of democracy, etc. Equally, they correctly observe that technological development looses its connection with socially defined useful ends and develops into an indeterminate ability for the expansion of power. But whose power and whose benefits are involved? To point out that technology is a project of humanity, as Habermas does in the same way, disguises the fact that this development of humanity occurred and still does occur within class societies. The open means structure of technico-scientific development (cf. Ullrich, 1977) indicates the open ended movement of capitalist accumulation: technology *must* be developed independent of its social usefulness so long as capital is accumulated and, therefore, has to be objectified in the form of fixed capital, so long as through accumulation capital has to continually expand and renew its independence of living labour. The social philosophers discussed here certainly legitimate this relationship of domination by redefining it as «objective law» but they—unlike the majority of authors in organizational and industrial sociology, who never even pose the problem—do at least describe the process as the subordination of men to constraints that are external to them.

In the arguments discussed so far basic dimensions of social production, such as technology, science or organization are treated as class unspecific areas of society, while concepts such as productivity, effectivity or rationality which describe the operation of these dimensions are basically defined as value neutral objectives and criteria of success. I have already suggested that I consider this view to be false — technology, science and organization, together with the criteria that assess their operation, they all have a central function in the process of capital accumulation and hence for the reproduction and solidification of capitalist class relationships. Therefore, the *basic question* which I have to investigate in the *following section* is: what is the role of technology and work organization in capitalist development? Do they represent areas which have developed a structural dynamic of their own and as such cut across capital accumulation, or is their development subordinate to the development of capital accumulation and its structural changes?

What characteristics are used to define in detail the concept of industrial democracy and how one judges the conditions and chances of its realization, both depend upon the interpretation of the connection between the development of capital accumulation, technology and work organization. If they are seen as closely linked, then one comes to rather pessimistic conclusions on the meaning and possibilities of industrial democracy; if by contrast the development of technology and organization is understood as a movement which creates new room for autonomy and self-determination, then the prospect for the realization of industrial democracy is more optimistic.

As far as the characteristics of the content of industrial democracy are concerned, the argument of the technological autonomy thesis allows more precise conclusions: on the basis of the thesis of the trend towards the objectification of personal domination, work autonomy is defined by the extent to which work action is laid down in advance by superiors (low autonomy) or whether it is laid down by the objective requirements of the equipment itself (high autonomy). Similarly horizontal co-operation is only determined by the extent to which the co-operation is not mediated through hierarchical positions. Here, the research result of Popitz et al. (1957 a) remains debatable. It could be argued that precisely those workers who worked on older equipment with «team» co-operation actually retained more possibility of working independently as far as their own tasks, the division of the work process and the variation of the forms of co-operation were concerned; that vice versa, through the greater adaptation of the workers, the functioning of the mechanical equipment did in fact severely restrict the workers' possibility of independent work within the «objectified» and «structured type» of co-operation. (Bahrdt, 1958, cites as examples of «structured type» co-operation the assembly line factory in the motor industry, in which, as it is well known, the fragmentation of work and the simplification of the work tasks are developed to an extreme extent.) This whole argument is based on the assumption, which is contained in the objectification thesis, that the autonomous activity of the worker and the objective inherent development of technology are both developing in the same direction; the possibility is not considered that technology contains within itself a form of domination which turns the growing individual responsibility of employees into a pseudo-autonomy. Industrial democracy is here related only to the immediate work situation, to characteristics of the work place and to the work activity of the individual worker: even the far reaching theses of Mallet (1963) merely extrapolate from the work place to the dimensions of the enterprise as a whole or of social production.

The same criticism applies, if in modified form, to the consequences for industrial democracy which are

drawn by the adherents of the thesis of the neutrality of technology. Certainly here aspects such as, inter alia, the qualification level, the possibility of different combinations of jobs, the utilization of the innovation potential of the employees are included as characteristics of the nature of qualified co-determination; the argument, therefore, does not apply just to the work situation by itself but to the individual workers' relationships with each other, i.e. it applies to a partial area of the work organization. Nonetheless, here, too, the nature of decisive parameters of production as a whole, such as science and technology and their operational criteria (productivity, effectivity, rationality), remains unspecified. The question is accordingly raised as to what value work autonomy understood in this way can have within a labour process which, in its totality, is unquestionably becoming more and more machine shaped. Is workers' self-determination even possible within the framework of a total production process which faces them as a pre-given entity? Does the increasing solidification of the enterprise into a semi-automatic process not indicate that self-determination and industrial democracy are more and more only possible through the gaining of influence on production as a whole and on the rules and methods of its organization? Even if—as it is attempted in recent «humanization of work» experiments—the workers' or the work group's opportunities for independent work are gradually widened, this in my opinion does not allow any conclusion on the possibility of influencing the production process as a whole; on the contrary, the humanization of work experiments that have been carried out up to now show that the aim is to tighten management's grip on production as a whole through a more flexible organization of the details of the work tasks.

Equally, when in the course of humanization measures which alter the work organization new technologies are actually introduced, this, too, occurs only with the aim of improving profitability in the face of factors which restrict productivity (e.g. fluctuation, absenteeism, inadequate product quality, etc.). If in this case part of the equipment and work situation is made to take account of specific needs and interests of the employees, there is nonetheless still assumed to be an identity of interests between management and employees as far as both the overall aims of production (such as productivity, effectivity, growth and profitability) and the basic structures of the capitalist production process (such as inter alia the division of mental and manual labour and the alienation of production) are concerned. If, as I would like to argue, in the following section of this paper, this technology and work organization, too, primarily have the function of supporting the capitalist accumulation process in specific areas of production at the given level of their technico-economic development, then this has the consequence that under these conditions industrial democracy must be limited to the conscious acceptance and legitimation of the ongoing rationalization measures of capitalist production.

The *second basic question* which I will discuss in *concluding section* is, therefore, the following: what dimensions of the production process, both in the enterprise and in society as a whole, do the two forms of industrial democracy involve? What basic conception of employees' interests, and hence of the aims and forms of production, are at the root of the two forms of industrial democracy? And finally, what chances do both versions have in view of the contemporary technico-economic developmental tendencies of the capitalist mode of production?

3. economic structural changes, technology, work organization and payment form

I would like now to present arguments in support of the *thesis* that *technology and work organization* cannot be understood as quasi naturally developing variables of social production, i.e. as exogenous factors, but on the contrary represent the material form of the self-unfolding of capital.

The form of the capitalist mode of production arose out of the development of merchant and money capital and of the different ways in which this capital created subordinate wage earners by separating the producers from their means of production. However, as long as capitalism operates within the framework of the pre-existing and largely craft form of work, it can only keep its superiority by economic power (as in heterogenous manufacture) or by the higher productivity of the co-operation of many workers (as in organic manufacture). However, as long as only the «subjective principle» of the division of labour (Marx, 1867, 401) is realized and the means of labour essentially correspond to those of craft production, the subordination of labour of capital is only of a formal nature. Only with the dominance, based on machinery, of the production of relative surplus value does the «specific capitalist mode of production» (Marx, 1865, 46, 60) predominate. Now, the accumulation of capital becomes principally based on the continual increase in the productivity of labour which is made possible because of the development of capacities of the social division of labour, the application of science in material production and the expansion of the productive power of objectified human labour in large scale industry. Capitalism becomes an «epoch-making mode of exploitation» (Marx, 1885, 42) only because of the

permanent pressure to develop the forces of production. This real subsumption of labour under capital which is secured by the wage mechanism, forms at the same time an «emancipation» of capital from living labour. Only when the continuity and the integration of the machine shaped process of production makes it possible to determine in detail both the employment and the utilization of the individual labour power and the co-operation of the workers, only then is labour power really subsumed under the valorization process of capital, which has found its material form in machinery. I will cite two quotations —one historical and one principal— in order to make clear the marxist interpretation on which I am basing myself here. Machinery «becomes the most powerful weapon of war to defeat the periodic rebellions of the workers, strikes, etc., against the autocracy of capital... one could write an entire history of the inventions since 1830 which have only come into life as weapons of capital against workers' revolts» (Marx, 1867, 459). «In machinery objectified labour as a dominating power faces in the production process living labour—this domination is the objectification of the form that capital has as the appropriation of living labour» (Marx, 1857/8, 585).

Marx's theoretically formulated argument can be expressed more precisely for the historical and especially for the recent development of the capitalist mode of production. Here I would like to present the basic arguments of a theory which Alfred Sohn-Rethel (1970, 1972, 1973 a and b) has developed on the *economic dual nature of late capitalism,* since this forms the basis of my thesis on the necessary connection between the development of capital accumulation, technology and work organization.

The traditional theories of imperialism and monopoly capitalism (Hilferding, 1910; Luxemburg, 1913; Lenin, 1916) analyze the transition from competitive capitalism to monopoly capitalism, which began with the «Great Depression» of the last quarter of the 19th century, as basically a phenomenon of the spheres («external» to production itself) of value economy and of the market (it is from this tradition, incidentally, that the idea within marxism of the neutrality of technology derives). By contrast, Sohn-Rethel stresses that at the same time «internal» changes in the mode of production have occurred which while they have to be understood as being in reaction to the existing crisis of capital valorization, also, however, involved the process of material production directly. Through the transition to machine production in large scale industry labour looses its individual character, although its form still remains that of private labour: with its real subsumption under capital, labour now takes on social dimensions and becomes functioning collective labour. The continuous and integrated production processes that have developed can only operate if both living labour and the machine processes are controlled and organized within a time continuum according to their separate partial functions. The necessary «commensuration» of all elements of the collective labourer according to a unitary measure of time requires the development of an economy of time or of a material economy of production which thus becomes an essential basis of the organization of work and the enterprise. Taylor's writings are the first theoretical formulation of such a «scientific management». Sohn-Rethel's argument (and Taylor's approach in practice) is that such an industry which is essentially determined by machine equipment is characterized by a different cost structure to that of early capitalism: because of the high fixed costs the valorization of capital is dependent above all on the full utilization of the productive capacity of the equipment. This maxim necessitates that production becomes permanent: highly developed production processes become inflexible in terms of costs because of the large growth in fixed costs in relation to proportional costs and hence can hardly at all, or only at the cost of progressively rising losses, allow for short-term ways of adapting to cyclical market movements and varying product quantities. Such production processes, therefore, are subject to the immanent laws of a continual pressure for production, a permanent expansion of production and a continuous increase in productivity. These pressures of economic production demand on the one hand an adaptation of the forms of the market (through cartels, monopolies, state intervention) and this impairs the effectiveness of the law of value or the market mechanism (Clark, 1923; Schmalenbach, 1928). On the other hand, the organization of the enterprise must not only compare according to a unitary measurement of time the different forms of labour and the different forms of utilized objectified labour, allocate them within an overall work process and optimize the timing of their actions, it must also ensure that to a certain extent this «man-machine system» is kept flexible and so organized that the fixed capital is turned over, i.e. amortized, as quickly as possible.

Taylor's efforts are concerned above all with the first of these tasks of work organization. Since today the normal view is that Taylorism is out of date and anachronistic, I would like to use a brief summary of his principles to prove my counter-thesis, i.e. that the basic maxims of management formulated by him are now so widely disseminated and accepted that they count as self-evident truths and Taylorism itself is accordingly considered only in terms of some of its peculiarities (such as Taylor's wage system, his specific form of foremen hierarchy, his attempt to

extract the maximum possible production from manual workers) which are in fact not at all important for his basic principles. An additional argument is that the other management strategies (flexibility, acceleration of capital turnover) could only be brought into existence on the basis of a time economy factory organization such as Taylor had first proposed.

In his formulation of the «Elements of Scientific Management» (1913) Taylor starts from the basic objective of as far as possible removing the application and control of human labour from the influence of the workers and placing it at the disposal of a centralized and effective enterprise management; only so, he claimed, could it be ensured that the expensive machinery would be used in the most economic way possible as was demanded by the sharpened competition. Through the scientification of the organization of production and through a new type of division between mental and manual labour he aimed to cost social labour power and so use it as effectively and as intensively as possible; here the decisive means is the conception of a systematic and analytico-synthetic time economy through which work is broken down into different elements so that every work process and finally the collective labour itself can be grasped in terms of specific and timed tasks. Work study allows the means of production to be shaped as is required, the fragmentation of the work processes for simplification and standardization, the timing of the work elements to save and standardize time, and finally the adaptation of the work requirements to the physiological capacity of the workers so that it can be used as effectively as possible. The core of this procedure is the standardization of work tasks and work times and the formalization of these norms through precise instructions; this is on the one hand a means of organizing the enterprise as a time economy, on the other hand as the way of strictly dividing conception and execution it is the condition for the domination of capital over the labour process. The selection and adaptation of the workers through personnel selection, planned training and work control also has this same double character, while the intensive and controlled use of labour power is to be secured through the centralization of management and the integration of foremen into the effectively utilized management hierarchy. Given the standardization of production conditions and quantities, incentive payment acquires the quality of a bonus wage and as the central instrument for the achievement of the requirements of production policies remains an essential part of the system, since only its use can compel the worker to subordinate himself to the performance economy of management. Finally, this strategy is backed up by organizational methods of isolating the individual worker.

All these principles—time and motion study, standardization of work and work times, selection and adaptation of the workers, creation of a specialized and functional enterprise hierarchy and management, incentive payment and strictly isolated treatment of individual work—today are part of the ABC of management. This applies, however, especially to what Taylor himself considered to be the cornerstone of his system—the elements of the task and the bonus wage. Already in his early lecture of 1895 Taylor justified the necessity of these principles by the production economy pressures of the changed cost structure: «The indirect costs may be the same as or higher than the direct wage costs, but they remain constant whether output is greater or smaller; the decisive factor is, therefore, the volume of output in its effect on unit costs» (Taylor, 1895).

An historical study of the development of *work organization and payment by results in Germany* (Schmiede & Schudlich, 1976) has shown that in the last 100 years of capitalist development, despite historically determined discontinuities, these principles have come to prevail across a wide area. For the last two decades this development can be described in terms of the following chief characteristics, the extension of which has been accelerated since the Depression of 1966-67: the expansion of analytical work study as the basis for the selection and utilization of labour power (this includes also new methods of personnel management and the refinement of sensory motor training methods); the dominance of systems of pre-determined times as more exact and more standardized methods of time economy; the extension of bonus wages by bringing the wage form closer to the principle of measured day work, in that the fluctuation proneness of payment by results payment is reduced; at the same time the expansion of time economy and payment by results into previously untouched sections of the collective labourer, such as the jobs of skilled workers and office workers; finally the unification of these elements into a new system of analytical work and performance assessment, which for the first time creates a unitary system of performance economy for a whole sector of a firm or concern and overcomes certain weak points of earlier methods.

Our thesis is that the development of work organization and incentive payment since the end of the «Great Depression» of the last century has to be understood as a process whereby the performance economy of capital becomes autonomous. This process was made possible by the acceleration of the development of productivity which was linked to the organization of the enterprise as a time economy; in line with Taylor's thesis that high profits and high wages mutually determine each other, this rise in

productivity enabled considerable increases in wages. Capital's desire to maintain and broaden this autonomy of performance policy also explains its relative willingness to make concessions on wages policy. The formation of an autonomous performance economy has to be conceptualized as the «emancipation» of capital from living labour in the sense that Marx discussed this for the development of machinery; it represents the attempt to secure the valorization of capital through the subordination of labour to the imperatives of a technically determined production process.

However, this process is in no way one which occurs without any contradictions. A study, carried also out by our institute, on the *Effects of Computer Usage on Work Organization and Working Conditions in Industry and Administration* (Kündig et al. 1977 a) has shown that the fact that the use of living labour is increasingly abstract at the same time enlarges its «disturbance potential». The study shows that the creation of a time economy orientated work organization results in concrete useful labour no longer experiencing its abstraction only indirectly, in the circulation sphere, but directly in the labour process itself—so to speak on its own body. The process of the real subsumption of labour under capital now continues into the labour process itself; the process certainly mutilates concrete labour and to a large extent subordinates it to and integrates it into the labour objectified in capital, but it does not however completely abolish it. The remaining functions of concrete labour develop into a «disturbance potential» which is manifested as the contradiction between the partial work(er) and the overall production process:

—The increasing value creation per employee (labour productivity) leads to capital being ever more compelled to ensure that every individual labour power does actually operate the expensive machinery correctly. The more valuable the machinery—and the fixed capital in general—the greater the loss which results from stopages or mistakes in production.

—The societization of labour is a process which is achieved through an accelerated division of labour. However, the further the division of labour advances, the more important are the consequences of any wrong action by any single partial worker. While the partial worker certainly has less understanding of the process as a whole, nonetheless he is increasingly directly able to bring it to a standstill (e.g. section strikes which within a very short time can bring large works complexes to a halt).

—The discrepancy widens between productivity and qualification and the results of mistakes at work become increasingly independent of the complexity of the mistake: in the most extreme case a semi-skilled worker can do just as much damage as can an engineer. However, because of the relative abstraction of his limited part of the work process—and not because he receives lower wages—the semi-skilled worker has a more vulnerable sense of responsibility than the engineer (unreliability, absenteeism, sabotage).

Because of the changes in the structure of capital, these trends in the development of the labour process lead to the necessity of adapting the work organization to the changed conditions of production. In addition, the adaptation of the work organization to market conditions becomes all the more necessary the higher the level of standardization and hence of rigidity that is reached in production; adaptation to market fluctuations means that it has to be ensured that it is possible to vary the quantity of output. Consideration of the use value criteria of demand as mediated through the market economy (wide and variable product range) requires that a certain amount of flexibility has to be ensured in the use of the production apparatus and hence of the specific sorts of concrete labour.

Finally, the possibilities of standardization and hence of rationalization in the time economy of small series production depends on the extent to which the labour process can be kept flexible despite the use of the bonus principle.

This overall development, and in particular the double nature of adaptation (on the one hand the increase in the flexibility of production in relation to market conditions, on the other hand the concessions to concrete labour), provides the framework within which in our opinion have to be judged the *new methods of work organization*—together with the technologies they involve—which in recent years have become so increasingly important as measures for «humanization of work» (cf. Kündig et al., 1977b; Kern & Kern, 1975).

The most important elements of the «new forms of the organization of work» are the expansion of the area of work (job enlargement and job enrichment), the formation of so-called semi-autonomous groups and the creation of time buffers in between the different work procedures. The expansion of the work area widens the area within which a particular labour power can be empoyed and so allows its utilization in a more flexible manner—one which is more tightly adapted to technical or economic conditions. In addition, this expansion of the work area is also the precondition for the creation of semi-autonomous work groups.

The introduction of these semi-autonomous groups transfers a part of the task of controlling the

possible disturbance potential into the work collectivity itself: the partial autonomy in the timing of each partial work task (the work process as a whole remains organized in time economy terms as a specific component of the overall production) proves itself to be a means for the intensification and/or rationalization of work and operates to discipline the members of the work groups. Domination that was mediated either personally or through the machinery is now replaced by the self-control and the self-disciplining of the group members. Possible cut-backs in performance by one group member are now counterbalanced by extra efforts by his fellow workers, or alternatively the member concerned is expelled from the group (and that usually means dismissal). Since the work task is pregiven and consequently the level of intensity of the total work fixed beforehand, semi-autonomous groups lead merely to a redistribution of the partial tasks. However, this does have the effect of increasing the effectivity of the total collective work (this was the reason why it was introduced in the first place). This is in no way to deny that these changes—just like many of capital's rationalization measures in the past—do in many cases enable a reduction of monotony, less physical stress, better adaptation of the work to the employees' biological rhythms, etc.

The creation of time buffers as a third and complementary component of a unitary strategy to increase flexibility secures economy in fixed costs by a wider use of the capital stock even when it involves friction in one production sector: it allows the integration of the overall production in time economy terms while at the same time allowing variations in the different sections of production to still be taken account of. In this way the creation of time buffers, particularly in incompletely standardized production processes, becomes the key to the integration of the separate partial worktasks in the overall production process; additionally it is the precondition both for the extension of the work area and for the formation of semi-autonomous groups.

The frequent claim that the new forms of work organization represent a «detaylorization» of the work process seem to us to ignore the realities of modern production. A modern, highly integrated production process, shaped by machine equipment and fixed capital, involves dangers for the valorization of capital (under-utilization of capacity, increased vulnerability to disruption and resistance by workers, inflexibility in regard to market fluctuations). In this situation the new methods of work organization serve precisely to ensure the maintenance of the basic principles of «scientific management» in a taylorist sense: the optimization of the time economy of the man-machine system, the retention of the principle of each task being defined by management, management control of the individual work processes and of individual sections of production. Management's ability to plan and to measure jobs, even when their content is expanded, indicates an extension and a reduction of the functions of centralized planning and control by capital over the labour process.

These varying arguments and conclusions on particular aspects of the developments and structural changes in economy, technology, work organization and payment forms can be *brought together* in the following *summary* (here, I am basing myself on the very impressive account of the developmental tendencies of material production presented by Harry Braverman, 1974, on the basis of the more advanced situation in the USA).

The dominance of the capitalist mode of production creates a universal necessity for a continual increase in productivity. This forces capital both to develop the social capacities of production (co-operation, technology, science, organization) and to place them under its own control. To an increasing extent the valorization of capital becomes dependent on the utilization of the productive capacities of objectified labour, i.e. above all on machinery. This aspect of the use of objectified labour, which in value economy terms expresses itself as the necessity for optimizing the turnover of fixed capital or for spreading fixed costs over the largest possible quantity of products, leads to the creation of a work organization which is adequate to this level of economic development and to its integrated and continuous technology: as a time economy directly related to material production, this work organization has the task of optimizing within the time continuum the partial functions of both living and objectified labour. The core principles of this management system were first formulated by Taylor (above all the organizational maxims of task measurement and measured day work) and they are still completely valid today; these key principles are the basis of the recent methods of work and enterprise organization.

This societization of labour is based on a continually expanding division of labour and on production processes which are to an increasing extent machine shaped. Its effects on the working conditions of the wage dependent population can be described as a polarization between overwhelmingly manual, repetitive partial work on the one hand and work entrusted with mental and control functions on the other (cf. also the results of Bright, 1959; Kern and Schumann, 1970). On the one side there stands an ever growing mass of manual and clerical workers who carry out more or less truncated partial tasks, whose qualification level is characterized by rela-

tively short training periods, who are subject to a rigorous and sophisticated time economy, whose possible identification with their work and its content is low, whose work is in the real sense of the work, abstract. On the other side, a relatively shrinking number of controllers of the production process is to be found occupied with scientific, technical or administrative tasks, whose duty is to direct, control and continually reorganize the production process according to the profit criterion, in whom are concentrated the mental capacities of the functional collective worker, whose work has as a precondition that they identify with the enterprise's aim of capital accumulation and who—not least importantly—have considerable material privileges. This polarization trend seems to being accelerated rather than reversed by the tendencies that can be observed today in the development of the most modern production and organizational technologies. Within the next decade the dominance of micro-electronics in production can be expected to lead to a further large reduction in skilled worker jobs and so to the industrial worker becoming the equal of the semi-skilled operator, computerization in administration, management, construction and research to a considerable decline in what have up to now been qualified professional and technical jobs, finally the achievement of electronic text processing in the office to the disqualification of broad white-collar strata—all these processes will accelerate the general lines of development which have been described here.

Here, possible misunderstandings must be avoided. I am not denying that in the course of the advance of mechanization and automation new demanding jobs (even if to a rather small extent) have been created and are being created in the form of specially qualified skilled workers, technicians and engineers. However, I wish to make clear the tendencies which these jobs continually encounter and which in the long-term deepen the polarization. On the one hand, these types of labour power, wherever their work is standardizable because of its frequency, are themselves subject to division of labour, mechanization, automation and the separation of the mental functions of their labour; such sectors have rapidly increased precisely in the recent past. On the other hand, the capitalist organization of work itself ensures that in so far as such forms of labour power are themselves active in the production process, they at the same time have allocated to them supervisory and control functions and enjoy corresponding privileges. The real question is, therefore, rather whether a new privileged layer within the working class is being formed at an intermediate level of production, while actual production itself is to an increasing extent carried out by an under stratum consisting of women, foreigners and the unskilled. For the development in the USA this thesis is supported by Braverman (1974), for Germany over a longer historical time period by Roth (1973), for the current situation by studies of the segmentation of the labour market (e.g. Menius & Sengenberger, 1976) and for England has been developed within a more class-theoretical framework by Giddens (1973).

The structural changes in technology and work organization—such is the *consequence* of this section—mean that as the material objectification of capital and as decisive variables of capital valorization the two areas of technology and work organization are both becoming to an increasing extent autonomous domains of capital. The autonomy of the production policy is at the same time the autonomy of management in the employment and application of living labour. The most recent forms of work organization do not themselves represent any reversal of this tendency, but rather continue it by adapting it to changed external conditions and at the cost of small concessions to the workers. All the same, as the time economy penetrates technology and work organization and as, linked to this, fixed costs also rise, so living labour, which is in addition increasingly independent for the worker's qualification level and room for independent work, also acquires an increasing disturbance potential. Both tendencies—the increasing abstraction of labour and the growing disturbance potential—have consequences for the conditions and chances of industrial democracy. It is to these issues that I now finally turn.

4. conditions and chances of industrial democracy

At the beginning of my discussion I distinguished between two different conceptions of industrial democracy: an economic democracy notion, which is today the subject of wide public discussion, and a socialist conception, which under contemporary political conditions appears to rather represent the illusions of the past, whether these are to be opposed or merely derided.

I would now like to discuss the consequences which the process of technico-economic development has for the conditions and chances of both conceptions, and in so doing consider the questions of the content and dimensions of industrial democracy.

If for a moment I permit myself the somewhat problematic undertaking of applying concepts of political theory to the level of the economy, then we can say that democracy does not mean the abolition of domination but that the form and content of domination are decided on by a sovereign power —namely the mass of the ruled themselves; in other words, unlike other forms of domination, democracy

means a broad legitimation of domination secured by specific procedures. The first notion of industrial democracy corresponds to this theoretical model: economic decisions are to be made on a broader basis, the domination which results from these decisions is to appear legitimate through the participation of the ruled. However, I believe that Schelsky's argument discussed above—namely, that the increasing dominance of technico-scientific type «objective rules» removes the political basis of democracy —does touch on the critical point of this notion (even if Schelsky himself transforms this insight into a conservative apologia for domination): if one replaces the abstract «objective laws» with the socially dominant and valid for every individual case imperative of capital valorization, secured as it is by mechanisms of the capitalist mode of production at enterprise, national and international level, then the question arises whether the representatives' decisions within this form of industrial democracy are not in fact largely pre-programmed by the laws of the capitalist economy. In my opinion the history of «co-determination» in West Germany, like the history of the trade unions in general, shows that only in isolated cases is the influence of the functionaries of the working class movement able to permanently secure the interests of the wage dependent population against the logic of capital. Generally, the developmental tendencies of material production which have been discussed here win out, either against the opposition of the trade unions or with their help (the latter usually justified with the argument that the competitiveness of one's «own» industry must be maintained). In co-determination the functionaries face an objective dilemma (one which in another form the working class movement as a whole is confronted with)—they must either defend previously positive characteristics of the work situation (as a rule this is a question of the wage level or the qualification, work autonomy or possibility of independent work which are linked to the status of the skilled worker or qualified white-collar worker)—and so expose themselves to the accusation that they are conservative and preventing further profitable growth, or they must subordinate themselves to the constraints of growth and rationalization and then however as a result of their decisions (i.e. the removal of these positive characteristics) come into conflict with their basis. The fact that in England the emphasis has lain more on the first of these two variants of behaviour and in West Germany more on the second (a difference that has recently been pointed out by Michael Mann, 1976), does not alter at all the dilemma itself, just as it does not alter the ultimate necessity of not killing the goose that lays the golden eggs in which one oneself participates.

The relationship between technology, economic development and the chances of achieving this form of industrial democracy has two mutually contradictory aspects. On the one hand technico-economic development with its increasing dominance of fixed capital makes clear that to an increasing extent the utilization of capital is dependent on a co-operative attitude of the workers to the requirements of capital valorization. To make the point clearly: when at the beginning of the industrial revolution a factory based largely on craft technology was brought to a halt by the opposition of the workers, then the factory merely made no more profits; now, when the same happens to a highly modern mechanized or semi-automated factory, because of the changed cost structure the same event leads to progressively rising losses. This fact is expressed in the thesis of the growing disturbance potential of concrete labour and of the unqualified worker. Apart from the historico-political causes and conflicts, which are particularly clear in German history (the revolutionary mobilization after the First World War, the restarting of production by the «Betriebsräte» (workers' councillors) and their nationalization demands after the Second World War), this difference is by itself reason enough for capital to try to ensure the co-operation of the wage dependent employees by granting the concession of participation in decision-making. This constraint on capital and capital's own interests together can explain certain aspects of the long-term increase in the representation and power of the trade-unions, as well as also their centralization and partial bureaucratization. Possibly this interest of capital in purchasing for itself co-operative attitudes towards the alteration of working conditions can also explain its greater readiness to make concessions in the area of wage policy, as well as the growing concentration of trade union policy upon this sector. This tendency of capitalist development would, therefore, suggest that the chances will tend to grow for the economic democracy variant of industrial democracy.

However, this is contradicted by the other aspect of the relationship of technology and industrial democracy. The policy of the firm is orientated towards work and performance conditions; if the autonomy of this policy can be secured by concessions and by a co-operative attitude by the workers, then the result is merely to accelerate the polarization within the collective worker described above. Not only the dominance of a time economy which is orientated to economizing and intensifying labour, but also the expansion of technology per se in most cases means an increase in the restrictive character of work, for technology itself is not only a combination of mechanical, optical or electronic functions, but also at the same time the objectified form of the work

organization. Just as Taylorism and Fordism do not represent two different and mutually independent lines of development of the capitalist labour process, but instead in Fordist assembly line work the Taylorist principles enter into the structure of the machinery, so the conception and construction of every technically developed piece of equipment involves defining, before the machinery is actually used, according to the principles of the capitalist organization of work the work that is to be carried out on it. When for example a hundred years ago qualified skilled workers stood in front of a turning lathe, so now automatic loading and the new technologies of metal working mean the dequalification of their jobs to semi-skilled, repetitive partial labour. To take another example. When today a machine building firm delivers an assembly line for the car industry, the work places on the assembly line are arranged with the aim of fragmenting the work into simple and cheap component tasks; often their extent and execution are pre-calculated according to standard times by MTM («Methods-Time-Measurement»), so that when the car factory purchases the equipment it purchases the MTM work places at the same time.

To make the point very sharply: in historical development technology and rationalization have meant for the mass of manual and white-collar workers an increase in the fragmentation and dehumanization of their work, while still today there are no relevant counter-tendencies apparent. For capital, by contrast, this development means increasing productivity, better calculatability of more easily controlled work and a strengthening of its ability to plan in terms of time economy—in other words, all in all the solidification of its autonomy from living labour.

In this process vital needs of the wage dependent population for human living conditions are continually being violated. Since this occurs despite or because of the co-operative behaviour of the workers' representatives, technologization and rationalization always mean a potential threat to the ability of this economic democracy form of industrial democracy to function. The actions of the Fiat workers in Mirafiori-Turin or the General Motors workers in Lordstown are merely the extreme forms of a struggle over working conditions which is always smouldering under the surface of the official conflicts. In recent years demands and conflicts over working conditions have become noticeably more important in all countries. In West Germany for example, issues such as work time, pauses, work speeds, new forms of performance assessment and payment have all gained considerable and growing importance and this partially explains the popularity of the «humanization discussion». In other words: if—and this is our thesis—the economic, technological and work organizational development of the past and of the coming decade is accelerating the trends towards the fragmentation, dequalification and abstraction of work, then this conception of industrial democracy will be endangered by an opposition—partly already visible today, partly a forseeable reaction in the future—from the affected strata of the working class which is largely incapable of effectively opposing. These problems cannot be solved by co-operation with management through industrial democracy, for this has up to now been largely based on management's readiness to make concessions on wages policy; problems such as these can only be monetarized to a limited extent and in addition now encounter a reduced ability of capital to pay. Like the problem of unemployment, which because of the world economic crisis has dominated public debate up to now, the area of work conditions could become an area in which the conflicts by-pass the institutions of industrial democracy. Such a situation is well known within political theory where it has been discussed as the crisis of parliamentary democracy or the legitimation crisis of political domination, being characterized by the fact that no consensus can any longer be found on the content of the domination which has to be democratically legitimated.

The tendencies of technico-economic development indicate that this «economic democracy» variant of industrial democracy faces both new chances and also a growing threat. According to experience, this contradictoriness will be expressed by fractioning within the parties concerned (cf. Giddens, 1973)—both within the employers' camp and within the working class movement. It is, therefore, perfectly conceivable that the institutions of industrial democracy will continue to exist without being endangered or even that they will be widened. Whether their social capacity to function will remain unaffected is, however, becoming a crucial political question, to which other speakers here will certainly be able to make more substantial contributions than I would be in a position to do.

As for the second, «socialist», form of industrial democracy, here we are on completely unknown territory, neither the bourgeois scientists (for comprehensible reasons), nor the socialist theorists (for less comprehensible reasons), have devoted much attention to the question of a socialist form of economy and the role of technology within it. Usually the question of a socialist economy is exhausted by politically defining it in terms of a workers' democracy (whereby the large part of the differences inside the left revolve around the form of this democracy) and the formal economic characteristics of centralization, planning, national economic protectionism, and the

central planning of the economy's sectoral proportions and growth.

The discussion of socialism usually takes for granted certain maxims which are meant to demonstrate the superiority of socialism over capitalism. The socialist economy has a higher growth rate, it develops the forces of production quicker, it can achieve technological «leaps» because the profit criterion does not compel the use of outdated equipment, the capital goods sector develops faster than the consumption goods sector, etc. This can be shown in detail from the writings of the «classics» such as Lenin, Trotsky or Preobraschenski, but also from the work of more recent theorists such as Liberman, Brus, or Sik.

Both these theoretical perspectives and, equally, the economic and political praxis of the USSR and the other countries of the «Eastern bloc» provoke the question whether these societies, which claim for themselves the achievement of socialist democracy have not in fact also become dominated or are becoming dominated by socially uncontrolled economic laws which are removing the foundations for a «socialist» democracy in the wider sense. Serious arguments in this direction are provided by theories which, inter alia, focus on the critique of «state capitalism», of «bureaucratic collectivism», of a «new ruling class» as expressions of a different and newly developed form of capitalism. The consequence of such arguments—which I cannot discuss in detail here but the basic tenor of which seems to me to be plausible—for my concern with the conditions and chances of industrial democracy would be that in the case of social systems with nationalized economy, centralized planning, foreign trade monopoly, etc., we are also confronted with a special version of the «economic democracy» form of participation of the wage dependent population in economic decision-making primarily operate as the social legitimation of forms of domination and of «objective» constraints that are seen as inherently necessary.

Before I now discuss the consequences of this argument for the characteristics of the nature of the socialist version of industrial democracy, I would like to recall a principle which is basic to marxist theory but which has largely fallen into oblivion both in the programmes and in the praxis of the marxists of the 20th century. For Marx the liberation of the workers, i.e. communism (the word «socialism» he always only uses in a negative sense to characterize petty bourgeois radical democratic currents), means at the same time liberation *from* work. For Marx the «realm of necessity», which would always exist to a certain extent, had to be reduced to a minimum, for only on that basis could the «realm of freedom» first develop. This postulate is linked to Marx's concept of work. While for Hegel the transcendence of the imposed character of work is possible through the self-realization of the absolute spirit (so that work finally becomes the self-activity of pure reason), Marx (cf. Schmidt, 1962), always stresses the non-transcendable character of work which follows from the irremovable link between work and nature, i.e. from humanity's material existence.

I have briefly presented this difference in the understanding of work in order to indicate an objective dilemma which faces the socialist conception of industrial democracy. On the one hand the liberation of the workers also means the liberation from work, i.e. the non-transcendable moment of compulsion in work requires the reduction of work to a minimum; on the other hand up to now in historical social praxis this reduction has occurred by means which to a large part are condemned by the other perspective, namely that of the rehumanization of work as a dimension of the self-realization of humanity.

Early in this paper I claimed that the socialist conception of industrial democracy must include the social dimensions of economic decision-making in the widest sense. We now see from the argument I have just presented that traditional definitions of the nature of the relevant form of society, whether in terms of the political organizational form of the workers' state, or whether in terms of economic organizational forms such as nationalization, centralization, foreign trade monopoly, etc., are all inadequate as definitions of the conditions of socialist democracy. In my opinion there exist a number of more wide-reaching conditions which—since I do not feel myself to be in a position to give definite answers—I would like to formulate in question form.

—Is it not an essential characteristic of such a society that it does not accumulate (unlike the case in both the programmes and the praxis of the Eastern bloc countries)? Historically and theoretically accumulation always means an expansion of the amount of the society's total collective labour which is to be expended. By contrast, does the highest aim of such a society not have to be the reduction of the necessary social labour time as a path towards the freedom from work?

—From this perspective does the concept of necessary labour not have to be completely reformulated? The women's movement has rightly stressed that in capitalism this concept is shaped by the necessities of this mode of production (necessary labour as labour which produces surplus value) and that whole areas of labour which are essential for the reproduction of society—such as housework or much of educational work—are not recognized as necessary in an economic sense. Would reducing social labour in production and

administration to a minimum not have to be carried out with the perspective of making time available for these areas, which from their nature are basic components of interpersonal communication and a crucial aspect of human self-realization?

—Is it not following Sohn-Rethel's central thesis which rightly appeals to Marx—a basic measure of the achievement of a classless and hence domination-free society the extent to which it has been possible to transcend the division between mental and manual labour which lies at the origin of class societies? Such a reunification of both dimensions of human existence includes their reunification within the same person. Is, therefore, the producer not in a classless society—since in its nature modern production represents the application of scientific methods and principles—only conceivable as a «worker-engineer» equipped with scientific qualifications: someone who undertakes the remaining manual tasks and at the same time develops the mental capacities of human co-operation?

—As a final question, does such a perspective not mean that technology must be primarily conceived and applied with the aim of saving labour time? And to be more precise. Does this saving of labour time—unlike the development of technology today, which always has the purpose of replacing complex human tasks with simple and/or objectified labour—not have to begin primarily with the simple, repetitive and stultifying tasks?

The manner in which these questions are formulated is somewhat tentative, but it does nonetheless indicate the direction in which in my estimation the answers could point. At this stage we could now pose the question of what these very wide ranging and perhaps rather speculative considerations have to do with our initial problem of the relationship between technological change and industrial democracy. I have put forward these ideas because in my view it is only through the discussion of such basic problems of social production that it is possible to formulate more exactly, and hence also to assess, a «socialist» conception of industrial democracy. For if the «economic democracy» form of industrial democracy is defined by the fact that the range of its operation remains within the framework of a conception of social labour determined by the logic of capital, so an alternative conception of industrial democracy can only be formulated within the framework of another and different logic. Such a «logic» is only conceivable as the shaping of social principles according to the interests of the working population.

Recently the question of an alternative technology has been re-opened (cf. Ullrich, 1977; Dickson, 1974). The criteria listed above could also contribute to clarification within this problem area: one could risk putting forward the thesis that with the development of production and organization technology in the last two decades, a development that has taken place above all through the introduction and further development of electronics, on the horizon there is now visible the objective possibility of the abolition of repetitive partial work, in the sense that living labour no longer stands directly within the immediate production process but only has to carry out, almost from outside the production process, planning, controlling, maintenance and repair functions. If this occurred, it would have the consequence that at least one objective precondition for the achievement of the socialist form of industrial democracy had been developed relatively far.

If these conditions of the socialist conception of industrial democracy are relatively vaguely formulated, then in the discussion of this form of industrial democracy's chances which I would like to finally raise, I must limit myself to identifying from this perspective moments in the current form of industrial conflicts which point towards elements of such a self-determination of the producers. Very generally one could perhaps say that in industrial conflicts an embryonic form of self-determination of the working population can be seen wherever through collective agreement and organization and without any willingness to compromise they oppose their immediate interests to apparently inevitable tendencies of capitalist production. Both struggles which directly express the elementary desire for freedom from imposed work (such as those at Fiat or General Motors), and also the continual attempts through struggles within the factory to set up minimal standards in opposition to the fragmentation, stultification and intensification of work, involve the two perspectives of the liberation of work and the liberation from work. The question of machine breaking, which in the last century could be criticized as a strategy which only looked backwards, now, too, appears rather differently given a technology which has built into it dimensions of the destruction of humanity. Subversion directed against this technology can perfectly well be an expression of human self-determination, for when one stops being human, self-determination becomes futile. By contrast, a strategy of the working class movement which tries to tackle the problem of the destruction of jobs through rationalization and unemployment by retaining jobs at any price, seems to me to be disastrous for the movement's own interests (this is not to deny that under given circumstances this can be a correct tactic). Instead of this, the trade unions should direct their activity more towards the abolition of material disadvantages resulting from unemployment and to-

wards the achievement of social recognition for useful activities which have up to now been strongly negatively sanctioned and defined as non-work (e.g. communication and education).

The chances of the socialist form of industrial democracy—so this argument can be summarized—are dependent above all on the clarification within the working class movement of its own perspectives and conceptions. It is receiving a forcible external stimulus towards this from the declining dynamic of capitalist development, which is expressing itself in rising unemployment, increasing performance pressure, falling ability of the system to pay, and which is reducing the long-term chances of the economic democracy variant of industrial democracy. One condition for such a conceptual clarification is work on the basic conceptions of the aims and forms of societal organization— something which has been an immanent component of the tradition of the working class movement since its origins. On these problems up to now the sciences have had more questions than answers to offer. However, perhaps the social problems which have increased so enormously in the recent years of economic crisis will provoke new contributions towards a clarification of these social theoretical questions.

WORKS CITED

Bahrdt, H.P. (1958), *Industriebürokratie.* Versuch einer Soziologie des industrialisierten Bürobetriebs und seiner Angestellten, Stuttgart.

Blauner, R. (1964), *Alienation and Freedom.* The Factory Worker and his Industry, Chicago-London.

Braverman H. (1974), *Labor and Monopoly Capital.* The Degradation of Work in the Twentieth Century, New York-London.

Bright, J.R. (1959), *Automation and Management,* Boston/Mass.

Burns, T./G.M. Stalker (1961) «The Management of Innovation», (Tavistock Publ.) London, in: R. Mayntz (ed.), *Bürokratische Organisation,* Köln-Berlin 1971.

Clark, J.M. (1923), *Studies in the Economics of Overhead Costs,* Chicago/Ill.

Dickson, D. (1974), *Alternative Technology and the Politics of Technical Change* (Fontana Collins), Glasgow.

Emery, F.E. (1967), «The Next Thirty Years: Concepts, Methods and Anticipations», in: *Human Relations,* Vol. 20 (1967).

Emery, F.E./E.L. Trist (1969), «Socio-Technical Systems», in: F.E. Emery (ed.), *Systems Thinking* (Penguin), Harmondsworth 1969.

Emery, F.E./E. Thorsrud (1969), *Form and Content in Industrial Democracy* (Travistock Publ.), London.

Freyer, H. (1960), *Über das Dominantwerden technischer Kategorien in der Lebenswelt der industriellen Gesellschaft,* Mainz.

Freyer, H. (1970) «Die Technik als Lebensmacht, Denkform und Wissenschaft», in: H. Freyer, *Gedanken zur Industriegesellschaft* (besorgt von Arnold Gehlen), Mainz 1970.

Fricke, W. (1975), *Arbeitsorganisation und Qualifikation.* Ein industriesoziologischer Beitrag zur Humanisierung der Arbeitswelt, Bonn-Bad Godesberg.

Fricke, W. (1976) *Zum Verhältnis von Produktionstechnik, Arbeitsorganisation und Qualifikationsstruktur:* Oberblick über den Forschungs und Diskussionsstand aus der Sicht eines autonomie-orientierten Ansatzes, mim. Manuskript (Beitrag zum Themenbereich Arbeit auf dem 18. Deutschen Soziologentag 1976 in Bielefeld).

Frielinghaus, K. (1957), «Belegschaftskooperation», in: *Heidelberger Blätter,* Heft 14-16 (1969/70), pp. 112-159.

Frielinghaus, K./G. Hillmann (1963), «Belegschaftskooperation und gewerkschaftliche Betriebspolitik», in: *Arbeitshefte,* Jg. 2 (1963), Heft 6/7, pp. 1-41.

Gehlen, A. (1957), *Die Seele im technischen Zeitalter.* Sozialpsychologische Probleme in der industriellen Gesellschaft, Reinbek.

Giddens, A. (1973), *The Class Structure of the Advanced Societies,* London.

Habermas, J. (1968), «Technik und Wissenschaft als 'Ideologie'», in: J. Habermas, *Technik und Wissenschaft als 'Ideologie'»,* Frankfurt/Main, pp. 48-103.

Hilferding, R. (1910), *Das Finanzkapital.* Eine Studie über die jüngste Entwicklung des Kapitalismus, Frankfurt/Main 1968.

Hillmann, G. (1965), «Selbstbestimmte Belegschaftskooperation —Tendenzen und Chancen», in: G. Hillmann, *Die Befreiung der Arbeit.* Die Entwicklung kooperativer Selbstorganisation und die Auflösung bürokratisch-hierarchischer Herrschaft, Reinbek 1970, pp. 7-14.

Katz, D./R.L. Kahn (1966), *The Social Psychology of Organizations,* New York-London.

Kern, B./H. Kern (1975), «Krise des Taylorismus? —Bemerkungen zur 'Humanisierung der Arbeit'», in: M. Osterland (ed.) *Arbeitssituation, Lebenslage und Konfliktpotential.* Festschrift für Max E. Graf zu Solms-Roedelheim, Frankfurt/Main-Köln 1975, pp. 71-105.

Kern, H./M. Schumann (1970), *Industriearbeit und Arbeiterbewusstsein,* 2 vol., Frankfurt/Main.

Kündig B./Z. Papadimitriou/J. Thomae/G. Brandt (1977a), *Sozio-ökonomische Aspekte des Einsatzes von EDV-Systemen und ihre Auswirkungen auf die Organisation der Arbeit und die Arbeitsplatzstruktur* (mim. Forschungsbericht des Instituts für Sozialforschung), Frankfurt/Main.

Kündig B./W. Müller-Jentsch/Z. Papadimitriou/R. Schmiede (1977b), *«Humanisierung der Arbeit» - Verbesserung der Kapitalverwertung oder Emanzipation der Arbeiterklasse?* (mim. Manuskript), Frankfurt/Main.

Lenin, W. I. (1916), «Der Imperialismus als höchstes Stadium des Kapitalismus» in: W.I. Lenin, *Ausgewählte Werke,* vol. 1, Berlin/DDR 1961, pp. 763-873.

Lutz, B. (1968), «Produktionsprozess und Berufsqualifikation», in: Th. W. Adorno (ed.), *Spätkapitalismus oder Industriegesellschaft?* (Verhandlungen des 16. Deutschen Soziologentages vom 8. bis 11. April 1968 in Frankfurt/Main), Stuttgart 1969.

Lutz, B./A. Willener (1960), *Mechanisierungsgrad und Entlohnungsform.* Abschlussbericht, Luxemburg.

Lutz, B. et al. (1962), *Grenzen des Lohnanreizes,* 2 vol. (mim. Forschungsbericht), Luxemburg; in überarbeiteter Form neu erschienen als: B. Lutz, *Krise des Lohnanreizes,* Frankfurt/Main-Köln 1975.

Luxemburg, R. (1913), *Die Akkumulation des Kapitals,* Frankfurt/Main 1966.

Mallet, S. (1963), *La Nouvelle Classe Ouvière,* Paris.

Mann, M. (1976), «The Working Class», in: *New Society,* vol. 38, No. 735 (4. Nov. 1976), pp. 240-243.

Marcuse, H. (1965), «Industrialisierung und Kapitalismus», in: *Max Weber und die Soziologie heute* (Verhandlungen des 15. Deutschen Soziologentages), Tübingen 1965.

Marcuse, H. (1967), *Der eindimensionale Mensch.* Studien zur Ideologie der fortgeschrittenen Industriegesellschaft, Neuwied-Berlin.

Marx, K. (1863/5), *Resultate des unmittelbaren Produktionsprozesses,* Frankfurt/Main 1969.

Marx, K. (1857/8), *Grundrisse der Kritik der politischen Ökonomie,* Berlin/DDR 1953.

Marx, K. (1867), «Das Kapital», Bd. I, in: K. Marx/Fr. Engels, *Werke,* Berlin/DDR 1956-1968, Bd. 23.

Marx, K. (1885), «Das Kapital», Bd. II, in: K. Marx /Fr. Engels, *Werke, Berlin*/DDR 1956-1968, Bd. 24.

Mendius, H. -G./W. Sengenberger (1976), «Konjunkturschwankungen und betriebliche Politik. Zur Entstehung und Verfestigung von Arbeitsmarktsegmentation», in: H.-G. Mendius et al., *Betrieb-Arbeitsmarkt - Qualifikation I,* Frankfurt /Main 1976, pp. 15-81.

Popitz, H./H.P. Bahrdt/E.A. Jüres/H. Kesting (1957a), *Technik und Industriearbeit.* Soziologische Untersuchungen in der Hüttenindustrie, Tübingen.

Popitz, H./H.P. Bahrdt/E.A. Jüres/H. Kesting (1957b), *Das Gesellschaftsbild des Arbeiters.* Soziologische Untersuchungen in der Hüttenindustrie, Tübingen.

Roth, K.H. (1974), *Die «andere» Arbeiterbewegung* und die Entwicklung der kapitalistischen Repression von 1880 bis zur Gegenwart. Ein Beitrag zum Neuverständnis der Klassengeschichte in Deutschland, München.

Schelsky, H. (1961), *Der Mensch in der wissenschaftlichen Zivilisation,* Köln-Opladen.

Schmalenbach, E. (1928), «Die Betriebswirtschaftslehre an der Schwelle der neuen Wirtschaftsverfassung», in: *Zeitschrift für handelswissenschaftliche Forschung,* Jg. 22 (1928), Heft 5.

Schmidt, A. (1962), *Der Begriff der Natur in der Lehre von Marx,* Frankfurt/Main.

Schmiede, R./E. Schudlich (1976), *Die Entwicklung der Leistungsentlohnung in Deutschland.* Eine historisch-theoretische Untersuchung zum Verhaltnis von Lohn und Leistung unter kapitalistischen Produktionsbedingungen (Forschungsberichte des Instituts für Sozialforschung) Frankfurt/Main.

Sohn-Rethel, A. (1970), *Geistige und körperliche Arbeit.* Zur Theorie der gesellschaftlichen Synthesis, Frankfurt-/Main.

Sohn-Rethel, A. (1973a), *Ökonomie und Klassenstruktur des deutschen Faschismus,* Frankfurt/Main.

Sohn - Rethel, A. (1973b), «Technische Intelligenz zwischen Kapitalismus und Sozialismus», in: R. Vahrenkamp (ed.), *Technologie und Kapital,* Frankfurt/Main 1973.

Taylor, F.W. (1895), *A Piece Rate System, as Step Towards a Partial Solution of the Labor Problem.*

Taylor, F.W. (1913), *Die Grundsätze wissenschaftlicher Betriebsführung.* Autoris. dt. Ausg. v.R. Roesler, Berlin-München.

Trist, E.L. (1968), «The Professional Facilitation of Planned Change in Organizations», in: V.H. Vroom/E.L.Deci (eds.) *Management and Motivation.* Selected Readings (Penguin), Harmondsworth 1970, pp. 349-362.

Trist, E.L./K.W. Bamforth (1951), «Some Social and Psychological Consequences of the Longwall Method of Coal-Getting», in: D.S. Pugh (ed.), *Organization Theory.* Selected Readings (Penguin), Harmondsworth 1971, pp. 345-369.

Ullrich, O. (1977), *Technik und Herrschaft.* Vom Handwerk zur verdinglichten Blockstruktur industrieller Produktion, Frankfurt/Main.

Woodward, J. (1958), «Management and Technology», in: T. Burns (ed.), *Industrial Man.* Selected Readings (Penguin), Harmondsworth 1969, pp. 196-23.