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Behavioral Scientists and Workers

A brief history of Swedish work environment research

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The Swedish Work Environment Fund
1987

BEHAVIORAL SCIENTISTS AND WORKERS:
- A brief history of Swedish work environment research

Rolf Å. Gustafsson and Anders Kjellberg

The Swedish Work Environment Fund, October 1986

No. 60-19-09

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FOREWORD

The Swedish Work Environment Fund is a major institution which has both guided and funded much of Swedish research on working life. The Fund also provides for education and training, publications such as this one, and for discussions between labor, management and academic organizations concerning the direction of future scientific work.

This publication was the outgrowth of the Psychological and Social Problem group, which had representatives from all main organizations of employers and employees concerned with the working environment. The committee conducted an overview of all the relevant activities in work environment research, starting from a very broad interpretation of 'psychosocial'. This meant for example, that chemical or ergonomic factors were covered to the extent that their social and psychological consequences were treated. The group also investigated occupational accidents, work organization and hours of work. It was decided that an overview of the history of work environment research might be of value. (An English summary of the group's report was published by the Fund in June 1986: Psychology at Work, Behavioural Science in Work Environment Research, Lennerlöf, L.)

One of the aims has been to reflect the complex way that research has developed. A look back at past events is often necessary to gain understanding of current methods and theories. An example of this is the 'personnel selection' tradition of industrial psychology, the practical importance of which has diminished today, but from which important methodological knowledge, significant to current research, has been derived.

The content of this report has been discussed by the committee on several occasions and an earlier edition was also circulated for comment to a number of individuals who have either been directly involved in some of the events described or who, for other reasons, could make valuable contributions. However, the report must not be regarded as an official report from the committee; the authors alone are responsible for the content.

This is an edited version of the Swedish original produced by Ellen Hall, editor.

Stockholm, October 1986

The Work Environment Fund

INTRODUCTION BY THE EDITOR

In Scientists and Workers we learn that there are certain characteristic theoretical orientations in Swedish social science which begin in the late 1800's and continue up to the present. Science is not viewed as "apolitical" and neither is it viewed as being adversarial. Research is seen as one important tool in assessing how social reality is functioning, and if it is functioning fairly and rationally. And although techniques for measurement and theoretical concerns change, working life research has been and remains rather pragmatic in nature. This means that social science is not performed in the ivory tower - but rather that it should flourish in the fields and factories of ordinary people.

Certainly the authors and I hope that the reader will find this brief account of the history of working life research of some interest, and that it will further mutual exchanges in the future.

Stockholm, June 1986

Ellen M. Hall

HUMANISTIC MOVEMENT - 1880'S-1915

The first industrial safety legislation was enacted in Sweden in the late 1880's. Although the Act was cautiously worded and did not apply to workers in agriculture or handicrafts, it did provide for inspections of the workplace. This legislation and the general social discussion about conditions in the workplace were initiated by liberal humanitarians who wished to improve working conditions.

For example, Miss Gerda Meyerson - a social worker - was instrumental in the formation of the Central Union for Social Work (CSA) in 1903 which promoted work reform and related education and debate. CSA also compiled reports on working conditions for the Swedish government.

In conjunction with the work done by the Committee on Occupational Hazards to reform the industrial safety legislation, a modest sum of money was made available to CSA to study the social consequences of industrial work. CSA gave this task to Kerstin Hesselgren.

Her fourteen page article was one of the earliest sociological discussions of the conditions of workers in Sweden. The study did not follow any given theory but was a descriptive report, colored by a sociological approach. It begins with a general account of the historical development and contemporary situation of the local community and of the match industry, and continues with a discussion on the nature of work, sanitary conditions and the effect of industry on home life. And she discusses women workers, child labor, wage and employment, health care, and housing conditions.

In addition to these early initiatives, statistical studies of working life were conducted on an experimental basis by the Board of Commerce between 1897 and 1912. Statistics were compiled for the bakery and tobacco industries, such as the number of employees, nature of the premises, age, gender, civil status, place of birth, housing conditions of the workers, etc. In the 1904-1917 period, bulletins from the Board of Commerce also included information on strikes, lockouts, collective agreements and unemployment statistics for various branches of industry.

The FFA's (The Swedish Workers' Protection Association, established 1905) main objective was to disseminate knowledge on occupational-safety measures, initially through exhibitions. In 1912 The Association launched its publication, 'Arbetarskydd' (Workers' Protection), which acquired the new title of 'Arbetsmiljö' (Working Environment) in 1969. Today the publication is an important forum for disseminating to a wider public - not least safety officers and similar professionals - the results of research into various aspects of working life.

Industrial working conditions

An early example of an appraisal of industrial working conditions is contained in the book, 'Det ekonomiska samhällslifvet - handbok i nationalekonomi' (Handbook of National Economics, Stockholm 1902). The principal author was Johan Leffler - who also conducted the first work statistics study in Sweden. One chapter of the book deals with industrial working conditions and includes a section of 'The difficulties occasioned by working conditions'. The section includes the following headings:

A. Economic Ills

1. Wages
2. Working hours
3. The nature of the work
 1. Dangers and hazards at work
 - a. Poor ventilation
 - b. The unsuitability of work premises
 - c. Congestion due to closely placed machinery

John Leffler and others had rather prophetic ideas - as can be seen in the following quotations from their turn-of-the-century report:

"Another conceivable problem is the one-sidedness and monotonous nature of the work. Because of the disposition of the work and the machinery used by large companies for production, numerous workers are forced to perform the same mechanical, tedious and soul-destroying work, year in and year out, without any variation in the work. A not inconsiderable proportion of the workers have merely to mind the machines, which do the actual work. Such employment cannot afford the worker any pleasure or satisfaction and, the longer the working hours the greater will be the proportion of the worker's life devoted to such a task.

.....
 Finally, the nature of the work can have a detrimental effect on the workers' morals. In the absence of the necessary supervision and control, this can happen if male and female workers work together, if the women work in premises which are hot, forcing them to go lightly clad, if women are employed in mines, if children and young persons work constantly in the company of adults in the same premises, if the work force includes undesirable individuals, etc.

.....
 Mention has already been made of the disadvantage at which individual workers find themselves in relation to that of large employers when negotiating terms of employment, because of the peculiar nature of the work. In spite of their right to change jobs and the freedom afforded them under the employment contract, workers can become so dependent on the employer that their material (economic) situation may also be adversely affected. This is first and foremost a result of their narrow training, which prevents their seeking work with another employer. Other causes bringing about the same result may be the remoteness of the factory in relation to other companies where the worker could apply for a job, or the lack of time available to look for different work, the fact that workers may be tied to a job because of pension rights or accommodation or land, or of job opportunities for members of their immediate family, or of an employers' cartel and so on. This state of dependency in which the worker may therefore find himself can become a serious matter if the employer takes advantage of the situation to reduce wages, demand longer working hours, impose a less advantageous disposition of the work and method of payment, to introduce oppressive rules, etc." (pp 518-519, Leffler et al., Stockholm, 1902)

In short, the 19th century debate on working conditions was part of an increasing interest in social issues in Sweden. Although no formal research was conducted, there were important systematic attempts to compile statistics about working conditions, and the popular debate and reports drew attention to the social and psychological consequences of working conditions.

SWEDISH BUSINESS SEEKS INTERNATIONAL CONTACTS TO PROMOTE PRODUCTIVITY FROM 1910

During the early part of this century, Swedish business and political leaders were concerned that too many people were leaving the country, and that Sweden was not economically competitive in the world market. It was believed that by emulating the management and organization strategies of the United States and Germany the economy would improve and emigration would decrease. And of course the increased profits would also help Swedish business to grow. During World War I further incentives to rationalize Swedish industry were felt, because of the blockade conditions.

This meant for example, that organizations such as the Swedish Academy of Engineering Sciences (IVA) and The Federation of Swedish Industries were strong advocates for a large scale rationalization of work organization. This included paying for the translation of American and German texts such as Fredrick Taylor's The Principles of Scientific Management (1913) into Swedish. There were visits to other countries to see the new assembly line production systems, and much discussion about the emerging fields of ergonomics and industrial physiology. In short, "scientific management" - imported and adapted from the U.S. and Germany - was a major factor in Sweden's industrial development. As is characteristic of this system of organizing work, we find a fascination with time management, productivity, with increasing efficiency in all aspects of working life.

An early example of IVA's activities in the field of industrial psychology is contained in the IVA Bulletin No. 36 'Industrial psychology' (Arbetspsykologi, 1924). In this Bulletin industrial psychology is described as auxiliary to the science of time and motion studies. Testing methods for personnel selection, psychotechnology, which had started to gain recognition in Sweden, are described as constituting a branch in the field of industrial psychology (which also included the issues of fatigue, extraneous conditions influencing work efficiency and efficient wages system).

Another example of IVA's involvement during this period, is seen in their Bulletin No. 106, 1934, 'Work analysis and time studies'

(Arbetsanalys och tidsstudier). The publication presents the addresses delivered at a time study conference organized jointly by IVA and the Association of Engineers and Architects in 1934. Four papers are included:

- The object and importance of work analysis and time studies
- The organization of work analysis and time-study work
- Work study in practice
- The results of work analysis and time-study work and their application in practice.

Subjects discussed in other IVA-bulletins include the development of production/assembly lines, work disposition and psychological and physiological factors. In the foreword, the author asserts the need '... to clarify the concepts and to impart much needed objectivity to the assembly-line production debate'. He explains that this has become necessary partly because of the far too negative account of the assembly-line work that has been given by a labor inspector.

IVA discusses the effects of monotonous work in the following way (1943):

"The fact that it is possible for mechanically controlled work to be less tiring for individuals than work carried out at their own pace comes as quite a surprise to the uninitiated. DUKER explained the phenomenon in the following way. To perform a job, whatever it may be, requires both physical and mental energy. Mental energy is required to manifest the will. The amount of effort required increases with increasing difficulty in the work to be done. In non-machine-controlled work, the worker himself must take the initiative for his actions and make decisions. Conversely, in machine-controlled work, less mental work is required as the procedure has already been established.

.....
To fully understand the research that has been done to date it is important to return to the earliest mentions of the problem of monotony. What is remarkable is that the question of monotony and its effects was not identified by the scientific community but in political circles. Consequently, its presentation was not scientifically objective but colored by politics. When the question was taken up by the trade unions, there was no desire to find any scientific explanation; unions merely expected confirmation of the fact that monotonous work to some degree involved stress and posed a threat to the health of the workers, which is roughly what happened. With the unions basing their approach on this preconceived idea, it would be unreasonable to expect that any scientifically valid or useful result could be obtained from the unions' questioning the workers about their attitudes to monotonous work. Clearly, if one starts

by spreading the view that repetitive work is monotonous and then asks if this actually is the case, the answers do no more than reflect the views expounded on the situation in the first place. Consequently, nearly all the workers confirmed the view that monotonous work was extremely boring. However, observations that have been made without any preconceived ideas fail to support this assertion. Researchers in psychology later addressed themselves to the problem of monotony and attempted to explain it more clearly." (The above account is taken from 'Conveyor belt production' (Flytande tillverkning) by H. Ager, IVA Bulletin No. 120, Stockholm, 1943.)

IVA's report was partly a reply to the following statement from a member of the Labor Inspectorate:

"We have eliminated muscular exertion itself, but in some jobs, we have introduced a strain on the nerves, a fraying of the mind - as one of our neurologists pointed out. What has given rise to this stress is the way in which work has developed in some occupations.

This phenomenon is not confined to industrial work but is equally prevalent, for instance, in the modern office environment, where the work has been mechanized to the same extent as in industry. Large modern offices employ countless typewriters and adding machines, stamping machines, etc., some of which are quite heavy to manage and generate a level of noise that to a great extent is wearing on the nerves. Work is often carried out in groups and must often be performed at a tempo that creates an atmosphere of rush and bustle. It is possible that the wear on an individual in such offices is greater than that to be found on many shop floors, since office workers need to think and use their brains amidst all the hustle and bustle.

When legislation was introduced to restrict working hours to an eight-hour day, it was estimated that production at the workplace would fall by some 15 %. Naturally, this would have to be countered; production would have to be increased. So a succession of new machines were introduced and the work steadily became more and more mechanized. The new machines naturally increased productivity but brought about a reduction in the number of employees. The cigar machines in the tobacco factories and the bottling and washing machines in the breweries reduced the work force by two-thirds - to mention just a couple of examples. The unemployment that this created subsequently disappeared with an increase in the number of vacancies in other branches of industry. However, apprehension about the future remains and is one of the causes for the unrest that is to be found in working life today.

The process of mechanization also gave rise to a greater division of the work into smaller work elements. Each worker had only his own extremely simple task to perform, regardless of whether the work was done by machine or by hand. The effect of the monotony inherent in such repetitive work varies from individual to individual. For a large proportion of the workers, this monotony makes the work tedious and kills any job satisfaction. Consequently, not only personal involvement but also professional skills and knowledge have disappeared in many branches.

In contrast, the fixed routine suits other workers. They like it. This is particularly true when the work is fully automated as one's thoughts can be elsewhere. The work is done mechanically and unconsciously. Some industrial psychologists call such workers 'day-dreamers'. They can focus their minds on thoughts totally unconnected with the work in hand.

Other workers find difficulty in maintaining the same working tempo throughout the day and are therefore pleased to have a machine or conveyor belt that dictates the speed of the work. 'I prefer working on an assembly line, even though it makes me nervous', declared a female worker."

(An extract from 'Occupational hazards in rationalized work' (Yrkeshygieniska problem vid rationaliserat arbete by I. Fischer, Sociala meddelanden 9, 1938, pp 641-646.)

Under the IVA position there were underlying assumptions that workers are components in the industrial process - in effect they were to be controlled and managed into being as maximally productive as possible. Of course not everyone accepted this position. In fact there was quite a lively debate about work disposition and about the psychological and impacts of assembly lines. Excerpts from two different points of view are presented above. In many ways this debate foreshadows later discussions in Sweden - both about workplace stress and about the desirability of having greater participation by workers in decision making at their place of employment.

In short, during the early part of this century, employers had a great deal of control over working conditions, and much of the "research" of this period was concerned with efficiency, as opposed to social or psychological consequences of work. Personnel selection procedures, fatigue problems and how rest periods should be disposed of, were typical concerns. Questions concerning the negative effects of rationalization were taken up - but largely by non-scientists.

MANAGEMENT PROBLEMS HIGHLIGHTED - 1930

Against the background of a wave of labor-management strikes in Sweden in the 1920's, a conference on "industrial peace" was held in Stockholm in 1928 at the initiative of the government. A special delegation compiled a summary report of the conference proceedings, which cited industrial safety as an example of a realistic and desirable arena for cooperation between employee representatives and the employers.

Another result of the conference was the establishment of the Institute for the Training of Foremen (ALI), in 1930. The courses arranged by ALI, in which both foremen and workers were able to participate, covered subjects ranging from economics and sociology to occupational health and industrial psychology. In cooperation with the Academy of Engineering Sciences (IVA), ALI started courses for work-study engineers which were held every year during the thirties.

APTITUDE TESTS FOR USE IN SELECTION AND ADVISORY PROCEDURES - CA 1945

The earliest example of the practical use of psychological tests for selecting personnel in Sweden was the industrial psychology activities begun at Sandvikens Jernverks Company in 1928 (steel work company). The initiator of the activities was a German psycho-technician.

During the forties, the Swedish State Railways (SJ) and the Military also used psychological selective testing in their personnel administration activities, and a department of industrial psychology was set up at the Institute for the Training of Foremen (ALI) for the prime purpose of selecting potential foremen and supervisors.

A large number of psychologists gained their first practical experience through these activities. And, a voluminous array of empirical data has also been built up as a result of these activities. For example there are psychological profiles on all young men, as a result of the military's programs.

1955 marks the establishment of the Institute of Military Psychology (MPI), which was involved to an impressive extent in various types of behavioral science, such as research into fatigue and man-machine problems. When the personnel selection activities were subsequently transferred to the Recruiting Area Office of the Armed Forces, the remaining research activities were transferred to the National Defence Research Institute (FOA).

Other organizations established in the 1940's were the Institute of Applied Psychology (PTI) at Stockholm University, and the Gothenburg Institute of Applied Psychology. Right from the start, the predominant activities were aptitude tests, which were the basis for vocational guidance and the planning of training. The institutes also pursued comprehensive research and development work into methods of measuring proficiency and intellectual function. The work was based on the advanced theory that had been built up in the field, especially in the USA. This work was of importance to psychologists practising in the field - it established a special field of competence for psychologists. Consequently, even as recently as in the 1960's, one's professional reputation rested to a large extent on

being proficient with these methods and theories. The institutes also carried out some research on problems associated with working conditions.

Mention should also be made of the establishment in 1944 of the Board for Psychological Aptitude Testing in Swedish Industry at the IVA. The Board included representatives from the Swedish Employers' Confederation (SAF), the Confederation of Trade Unions (LO), the Federation of Swedish Industries and the universities. The board was intended to promote cooperation, information, documentation and research into the use of the science of psychology in personnel policy in industry.

In conclusion, research into industrial psychology was for many years largely concerned with selective and aptitude testing and related advisory activities. This is described in the survey of industrial psychology in Sweden written by Gunnar Westerlund in 1950:

'In addition to psychological aptitude testing used for vocational guidance and the recruitment and promotion of personnel in industry, psychology also played a part (albeit on a much smaller scale) in industrial education and training.

.....
As to the welfare of individual employees at the workplace, psychology has played only a very minor role. Although there have been tendencies to have recourse to psychology in respect of accidents..., appraisal of the demand that an occupation makes on employees in that field..., interruptions to work and suchlike, there have been very few published findings. Studies are also in progress into the duties of foremen and supervisors in industry.'
(G. Westerlund, 'Work psychology in Sweden' (Arbetspsykologi i Sverige), Nordisk Psykologi, No. 2 1950.)

RATIONALIZATION: MAJOR PRACTICAL ADVANCES AND INTENSIVE PUBLIC DEBATE
- ABOUT 1945-1955

Swedish work organization was influenced from an early stage by developments in other countries, where production was guided by economic efficiency in particular by time and motion studies - or Taylorism. This intensified during the post-War years. Perhaps less well known is the relationship that social research had to this development.

At this time, research and social science were separated from organizational/occupational questions - and most of the social debate concerned economic issues. During the post-War period there were labor shortages. Generally it was believed that by cooperation, compromise, rational decision making there would be a "bigger pie" to share between all of the concerned parties - including trade unions and working people. It is important to note, however, that the emphasis which was placed upon productivity as the means to this end, did not include an explicit analysis of the socio-emotional burden which was borne predominantly by the working class.

The formation of the Work Study Council (1948) should be viewed against this background. It was a joint committee between employer and labor organisations and promoted, at both the national and the local level, cooperative and efficient relationships in working life. These various local and national "work study" councils promoted the idea of efficiency leading to the greatest good for the greatest number - and it was believed that any resistance to this idea was the result of lack of information, and therefore it was up to the various councils to provide this information.

While labor management-agreements recognized the right of the employer to set up and design time and motion programs (provided that the employees were informed and consulted) these forms of rationalization were the subject of intensive public debate. Two terms frequently cited in these discussions were 'contentment' and 'job satisfaction'. The following text provides a summary of the thrust of the debate.

"Time studies have created widespread discussion in the workplace and in the Government. Are they a social evil? Or are they socially beneficial but a source of irritation to individuals? As well as employers, do not employees and society at large stand to benefit

from the study and rationalization of working methods? But do time studies need to be carried out in the way they are today? Could there be something wary in the way they are applied, for the prime purpose of timing work in order to adjust piecework rates? Do they bring out an abnormal working tempo, which takes its toll from the health and vigor of the workers? Has enough attention been given to the human factor known simply as job satisfaction and contentment at the workplace? Are there other areas in the field of work science which should be supported and encouraged to achieve the object for which we are all striving: maximum productivity with minimum consumption of human labor? And who is to guide these scientific studies - the employers alone or the employers in consultation with the workers? Or perhaps society should control this as well." ('Work science - not just time and motion studies' (Arbetsvetenskap - inte bara tidsstudier), Stockholm, 1946)

The debate was taken up at conferences, in articles and by authors, such as Folke Fridell and Torvald Karlbom, who (1949) published a number of essays in which workers relate their experiences and feelings about their work.

While the discussion concerning psychosocial aspects of working life was largely restricted to anecdotal and descriptive accounts, the study of organizational efficiency was rather sophisticated.

However, some working people, notably those at the Volvo-Penta plant, initially rejected the new form of work organization, and this in turn generated political conflict within the union and the labor force. One of the main questions which had to be resolved was the issue of whether employers had the right to manage and delegate work, or whether employees had rights, as well. In an agreement reached in 1955, it was decided that when MTM (time and motion studies) was being introduced for setting piecework rates, this could be used in local wage negotiations - but the actual introduction of MTM methods could not be negotiated.

On the initiative of leading representatives of Swedish industry SNS (the Industrial Council for Social and Economic Studies) was set up in 1948. SNS was, and continues to be, of importance to research and discussions concerning working life in Sweden.

During this period (late 40's and early 50's) SNS sponsored the first major industrial sociological study in Sweden. This was a survey of 2,700 blue and white collar workers, who were examined in terms of their adaptation to the industrial environment. In terms of industrial sociological methods and theories, this study was a model, which was followed for more than a decade. In this period sociology was established as an academic discourse in Sweden.

SNS fostered cooperation between companies and researchers. It also encouraged public debate through analysis of economic, sociological and psychological problems, and through disseminating information about the findings. SNS was an independent institute whose members consisted of individuals holding senior positions in commerce. Initially activities were financed by contributions from members and by grants from various companies. In fact a chief objective was to stimulate companies to participate in the social debate that was taking place during this period about a planned economy. In this way, a positive alternative view of the economic and social developments in the modern industrial society was put forward. This included concepts from the human relations movement in the USA.

More specifically American research such as the Western Electric studies, brought attention to the relationship between informal social relations and productivity. The human relations school inspired research which emphasized contentment, satisfying the needs of people at work, management problems and enhancing productivity by creating congenial working conditions.

SNS based its organization and research-initiating role on the mutual understanding that was established between labor-management in the 'Saltsjöbaden Agreements' of 1938. This agreement established the principle of autonomy for the two sides of industry, free from inter-

vention by the State in wage negotiations and other matters on which the two sides could reach agreement. It cemented the spirit of mutual cooperation between employers and employees and was an offspring from the conferences on "industrial peace" held in the late nineteen-twenties.

The rules governing the way in which these objectives were to be met were defined in the agreement: the Labor Market Council was formed (with the employers and unions each having three representatives on the Council) and charged with the responsibility addressing such matters as dismissal and lay-offs, interpretation of agreements on collective bargaining, limiting strikes and other economic weapons which could be used at times of industrial conflict, etc. The rules governing negotiating procedures between the parties were also drawn up. The famous Clause 32, which asserts the right of the employer to manage and delegate work, was accepted again as a fundamental principle by the parties to the agreement.

THE SWEDISH COUNCIL FOR PERSONNEL ADMINISTRATION - FIRST MAJOR ASSET FOR RESEARCH INTO WORKING LIFE - 1952

In conjunction with its fiftieth anniversary in 1952, the Employers Association (SAF) established an institute for research, study, consultation and information services concerned with working life. This was called the Swedish Council for Personnel Administration (PA-rådet), and it had the following objectives:

'To coordinate, develop and disseminate information and consulting services relevant to labor problems, with special emphasis on personnel administration and industrial psychology;
To further research in the field of work study; and
To further greater understanding in industry of the problems associated with labor'.

(Text taken from a memorandum from the personnel administration committee to the working party at SAF, May, 1952.)

A Board was appointed by SAF to lead the organization, supported by a Council whose task was to perform an advisory function. The Confederation of Trade Unions (LO), the Central Organization of Salaried Employees (TCO) and the Labor Market Board were invited to appoint representatives to the Council.

From 1970, LO and TCO representatives also sat on the Board (which, from 1977, included additional representatives from the Confederation of Professional Associations, SACO, and the National Federation of Government Officers, SR). This was a reflection of the desire to widen the base of the PA-council's organization and scope, in order to strike a better balance between the parties represented in the Council, a move which at that time was led by the executive management. However, in the early 1980s the PA-council (now under the name of "FA-rådet") once again came under the auspices of SAF. This could be seen as a reaction to the forming of the Working life center (page 36), which mainly is conceived as a research institution affiliated with the trade unions.

The driving force behind the establishment of PA-rådet was Axel Enström. In earlier work, he had engaged a number of consultants to initiate and lead discussion groups to give foremen/supervisors and workers the opportunity of exchanging views and experiences

in order to enhance mutual understanding and to improve the working atmosphere. No doubt the positive results of these activities were a considerable incentive to Enström's involvement in PA-rådet.

It served as a source of funds for the growing research on working life issues conducted by universities and colleges, but an increasing proportion of the funds went to researchers working directly under PA-rådet, after the establishment of a special research department in 1967. (However, the money made available internally was only enough to finance the basic facilities required for research.) After 1967 most of the research conducted under the auspices of PA-rådet was financed from external sources, such as the Swedish Council for Research in the Humanities and Social Sciences (HSFR).

The major organizational changes at PA-rådet of importance to industrial research may be summarized as follows:

- The establishment in 1955 of a professorship at the Stockholm School of Business, which was associated with PA-rådet.
- The establishment of an industrial physiology department, as part of a joint venture with the Forest Research Institute of Sweden and the Central Gymnastics Institute. The industrial physiology department was run by a special board which included representatives from the PA-council.
- The industrial psychology department at the Institute for the Training of Foremen (ALI) was in 1956 transferred to PA-rådet.
- In 1959 the Department of Industrial Psychology, API, was set up at the PA-council. The activities of the department involved psychological studies in conjunction with vocational guidance and other labor advisory work.

The research activities were based on the approach and questions emanating from the human-relations tradition. Another influence was the FUKI principle. FUKI is an acronym for research, training, consultation and information. This research was influenced by the questions predominant in foremen/supervisor training, organizational development and consulting services in the field of company and personnel administration.

It would be difficult to overstate the contribution made by the PA-council to industrial research, study and development up to about the mid-1970's. The organization expanded rapidly, especially in the provision of consulting services. For some time, the PA-council constituted a meeting point and workplace for the majority of industrial researchers who today work from a diversity of bases in socialpsychology, psychology and sociology. Many important scientific papers and documents have been published by this organisation. The following example illustrates the influence this work has had.

During his time at the PA-council, professor Bertil Gardell wrote his sociological thesis, 'Production Technology, Alienation and Mental Health' (Produktionsteknik och arbetsglädje, PA-rådets skriftserie, meddelande nr 63). This was a study on the relationship between different measures of job satisfaction (and other responses to work) and objective job characteristics. He particularly demonstrated the importance of freedom and expertise in relation to job satisfaction. This research laid the cornerstone for the work subsequently pursued by a research group at the University of Stockholm. Gardell's basic approach has been incorporated into studies on technology, work organization, working-hour systems, co-determination and autonomy at work, and the relationship between these factors and psychological and social conditions.

Many other leading researchers in the field of working life research had their first experiences at PA-rådet - we note that at the National Board for Occupational Safety and Health, the Work Psychology Unit is directed by the former director of PA-rådet.

Folke Haldén, former chairman of the board and council of PAR, states:

"Many observers were critical of the direction in which we (at the PA-council) were moving: they thought that the activities tended to be too academic and too scientific, and that insufficient attention was being paid to the practical problems familiar to companies. The reality behind this criticism reflected the fact that far too few researchers had addressed themselves to the problems associated with working life. It was therefore important to recruit more scientifically qualified persons. Such qualifications would have to be acquired in forms that would enjoy the respect of other researchers and, in some cases, lead to doctorates being gained. A considerable number of behavioral scientists gained their qualifications in conjunction with working on PA projects, with the result that, over

a fairly short period, the number of persons qualified to carry out research into working life became quite respectable.

The scientific methodology used was unavoidably also something of an issue. The jargon employed could sometimes be a source of annoyance to those active in the practical world, who were unfamiliar with the specialized vocabulary. Consequently, the major dissertations were supplemented by other publications, such as reports of major consulting assignments. PA-rådet also made a concerted effort to make the experience of the consultants and the findings of the researchers widely available in popular form."
(p 136, PA-Rådet, 1978)

BREAKTHROUGH OF THE SOCIOTECHNICAL APPROACH - RESEARCHERS INVOLVED IN PRACTICAL EXPERIMENTS - ABOUT 1965

The years between the middle 60's to middle 70's were important in the history of Swedish industrial research. Work-organization problems were pursued which involved a unique emphasis, scope, intensity and multilateral cooperation. A cornerstone for these activities and experiments was the sociotechnical systems theory, that a mutual relationship exists between the technical system and the social system. Therefore, the choice of technique influences the choice of work organization and vice versa. Consequently, to change working conditions requires simultaneous changes in both systems, not concentration on a single subsystem, as was the case in the Scientific management and Human relations schools.

The Swedish interest in these matters was inspired by the Norwegian "Cooperation Project", in which there were large scale attempts at new forms of work organization. Three main sectors are distinguishable in Swedish research activities:*

1. The URAF experiments

In 1966, agreement was signed between employers and employees to establish the Development Council for Collaboration Research (UR), '... to promote scientific research into collaboration issues'. In 1966, UR appointed a working group to plan research in the field, and, in the first report it submitted an outline was given of work-organization experiments.

They also published a summary account of the philosophy behind, and the experience gained in, the Norwegian experiments conducted within the "Cooperation project". This book (E. Thorsrud and F.E. Emery: Democracy at work, 1969') paved the way, in terms of opinion-building, for similar Swedish experiments in creating autonomous work groups at the shop floor level. This was a significant attempt to alter the well known negative effects of assembly line work.

In the four experiments conducted under the auspices of URAF, the main idea was that researchers should collaborate with employer

* This section is largely based on the work of Thomas Sandberg, 'Work Organization and Autonomous Groups', Liber Förlag, Lund, 1982.

and employee representatives. The experiments included careful identification of work problems, and proposals for resolving them, such as changes in group organization, widening and enrichment of the content of the work, transition to a salary wage system and decentralization of certain planning functions. The experiments were evaluated in terms of the level of job satisfaction experienced and, to some extent, in terms of efficiency and the amount of organizational influence enjoyed by individual employees. Another important objective (not realized in practice) was to create an ongoing process which would continue after the project itself had been completed.

2. Work on autonomous groups by the SAF (Employers Association), technical department

SAF's technical department was formed in 1966, partly because of problems among employers about the sharp rise in labor costs. The department focused on different wage forms and the relationship between these and motivation and productivity. For example, the technical department was influenced by the new system initiated by the management of the Fagersta iron and steel works. Since the end of the 1950's Fagersta had made a transition to paying groups on the basis of total productivity or group piece rate pay within certain sections. In 1963, talks concerning team or group work and pay scales was also started and visits were made to one of the Norwegian companies participating in the Cooperation project.

At a conference in 1969 arranged by SAF, the concepts and experience from the Norwegian experiments were presented to a wider circle in Sweden. A number of companies contacted the SAF technical department with requests for help in starting locally initiated experimental changes in work organization. The SAF experiments were initiated and implemented locally, without researchers. Solutions to local organizational problems usually involved a decrease in horizontal work division - for instance. However, the basic management-labor relationship would remain intact. The experiments were not evaluated by traditional research methods, but there was an emphasis on increasing efficiency and job satisfaction. Another important feature of the activities of SAF was that the work involved more production engineering changes than was possible in the other sectors.

SAF has pointed out that their involvement should not be regarded as research, but rather as consulting assignments aimed at providing support, guidance and the imparting of experience to encourage practical developments at a local level.

3. Experiments in the public sector: the FÖDD experiments

These experiments were initiated in 1969 and involved State-owned companies. In the public sector there had been political demands for democratization at the workplace. In 1968 the industry minister commissioned a delegation for experimental activities in industrial democracy in the public sector. The directives for the delegation known as FÖDD (Industrial Democracy Delegation) included the work-organization aspects of the general industrial-democracy issues.

However, FÖDD encountered difficulties in finding companies who were willing to take part in the experimental programs. Nonetheless, a number of pilot studies were carried out and reported. The researchers, in cooperation with the employee organizations, were the driving force in this sector. However, the proposed changes were only implemented in a minor way and only rarely touched on issues of the work process or organization. In the evaluation of the experiments, the emphasis was put on job satisfaction and the amount of influence enjoyed by the employees.

BEHAVIORAL-SCIENCE RESEARCH INTO ACCIDENTS - CA 1965

Accident prevention has been of central importance in practical efforts to improve working conditions, and has often been the objective of various information campaigns and publications. Within the work environment research conducted by behavioral scientists, the problem of accidents has, however, not been an equally prominent issue.

Previous international research was largely aimed at identifying accident-prone individuals. It is clear that this exhaustive line of research lead to a dead end, and it has not been emphasized in Sweden.

The first major Swedish study of occupational accidents was the 'Sandviken' study conducted in the 1950's. This epidemiological investigation attempted to identify critical characteristics of situations leading to accidents.

Since the epidemiological approach cannot be used, strictly, to determine the causes of accidents, later studies used a systems-analysis approach, where an accident is viewed as a product of the complex interaction of the different elements in the total man-machine-environment system, and not just as a single end point. The analyses have included factors such as the organization of work and production, and wage systems. There is also considerable interest in analysing near-misses instead of actual accidents.

New prerequisites for accident research were created with the establishment in 1979 of the Information System for Occupational Injuries (ISA) at the National Board of Occupational Safety and Health. This gives information about all occupational accidents, including details of the working conditions and the chain of events leading up to the accident.

THE NATURE AND ORGANIZATION OF RESEARCH BECOMES THE SUBJECT OF CRITICAL SOCIAL DEBATE - THE MENTAL HEALTH CAMPAIGN AND THE 'SOFT-DATA' DEBATE - ABOUT 1968-1970

During the late 1960's, critics questioning the fundamental values and nature of western industrial society gained a larger social influence. More than anything else, this meant a renaissance for Marxist social analysis and social critique, especially within the universities. The Anglo-Saxon positivistic scientific ideal was challenged and there was interest in other (particularly German and French) traditions in social research. Two examples of the importance of this movement was the debate on the mental health campaign and the 'soft-data' debate.

The forerunner to the mental health campaign was the 'Four-M campaign' (an acronym of Man, Machine, Environment and Exercise). The Four-M campaign, which was directed at the physical problems in working conditions, was a success. And it became clear that it was necessary to complement and widen the debate to include psychological and social issues as well.

The mental health dealt with psychosocial factors and was initiated by the FOLKSAM insurance company in 1969 and supported by both sides of the labor market and a large number of other groups. The aim was to set in motion extensive discussion of working life and psychological well being. However, a book, 'Konsten att dressera människor' (How to house-break man), was directed against the campaign and against the entire body of Swedish work-study research. This was personified in the public mind by the Swedish Council for Personnel Administration (PA-rådet). Established researchers were attacked and accused of working purely in the interests of the employers. Critics maintained that work research was based on a false promise of harmony between employer and employee. It was said that this harmony resulted in problems being resolved by the workers adapting themselves to management's reality, as can be seen in the following:

How to house-break man

'The campaign is based on the myth that everyone - both employees and employers - have a common interest. This is why the Swedish Employers' Confederation (SAR), employee organizations and other popular movements are among those supporting the campaign. The deci-

sion to support the campaign has been made by those at the top, without the members having been given an opportunity to express their opinions.

The mental-health campaign cannot be seen as an isolated event. To us, it is a manifestation of the bourgeois ideology existing in society. In turn, this ideology must be seen for what it is - a direct consequence of the political and economic structure.'

(Christiansson, L., Fahlén, T., Flordh, Ch., Grosin, L., et al., 'Konsten att dressera människor - Mentalhälsa-arbete-ideologi'. Prisma, Stockholm 1969. Extract from the foreword to the book.)

Even if the attacks against individual researchers were in large unjustified the debate influenced the direction of industrial research. A consequence was that the hitherto lively field of industrial psychology came to a standstill. Thereafter, terms such as work adaptation, mental health, job satisfaction, personnel selection and the like were used carefully and with a greater awareness that scientific studies and arguments are not necessarily apolitical.

"A distorted picture of Swedish work study" - a reply to the book "How to house-break man"

'A group of Marxist psychologists and psychiatrists have attacked Swedish occupational research. This attack occurred in the recently published book, 'How to house-break man'. The accusations are the same old ones: researchers are all hired lackeys in the service of Capitalism. The purpose of our work, they claim, is to preserve the existing power structure. The book is of a totally political nature - which the authors clearly stated. It follows that anybody and everybody who attempts to find other ways of solving the problems of society is a weapon in the hands of the Establishment. This applies above all to the ideology of mutual understanding, agreements on co-operation, and other forms of collaboration between the two sides of industry. The term cooperation is almost as objectionable as the word profit. Even the Social Democratic party, the trade union movement, etc. are in conflict with the true interests of the People. ... The authors say that labor and capital are insuitably on opposite sides of an open conflict.'

(Bertil Gardell 'Konsten att dressera människor - Vrångbild av svensk arbetsvetenskap', Läkartidningen, 1969, 66, 5105-5110.)

The 'soft-data' debate

As sociology established itself as a special discipline at Swedish universities in the 1950's most of the interest and research activities were based on American-style empirical sociology. There was a tendency to avoid so called speculative theories - i.e. those not based on empirical data.

However, towards the end of the 1960's, the 'soft-data' approach emphasized the benefits of widening the definition of data in sociological investigations. Observations from participants, journalistic accounts, historical documents of the social process and conditions were acknowledged as valuable contributions to social-science studies. Connected to this was also a growing interest in general sociological theories.

As compared to sociological research, psychological research was influenced in a different way by these debates. The impact was not as great with respect to methodological questions and the traditional scientific approach still dominated research. But the debate did have an impact on the selection of research issues. One response to all of the social criticism was to avoid applied research and to perform basic research. Another response was to apply the methods developed in testing and experimental psychology in new ways and in different contexts, such as research on occupational stress, and behavioral toxicology. Practising industrial psychologists drifted away from the problems associated with personnel selection and contentment at work and became involved in group dynamics.

GROWING INTEREST OF TRADE UNIONS IN OCCUPATIONAL RESEARCH - 1965

Upto 1965 employers and researchers took most of the initiative in the development, and the selection of, research issues related to working conditions. This extended, for example to production engineering, business economics, industrial medicine and the new technologies (computers, robots and process chemistry), etc. However, since the 1960's, the trade unions and employee organizations have become increasingly involved.

In 1966, a book entitled 'Teknisk förändring och arbetsanpassning' (Technological change and working conditions) by E. Dahlström, B. Gardell et al. (Prisma, 1966) was published as an independent contribution to a Labor union (LO) congress. This book, written by a group of sociologists, increased LO's consciousness of the relationship between technical conditions and such issues as labor's wellbeing, participation, wages, etc. Another important example of LO's involvement in the field are the series of publications on work environment questions, such as the findings of a comprehensive questionnaire survey on working conditions conducted by LO (LO-undersökningen 1970 och 1980).

Practically all organizations in the trade union movement now have specific policies and activities concerning occupational research.

COOPERATION BETWEEN DISCIPLINES - 1970

In 1970, there was a growing interest in the neurotoxicological effects of solvents. The methods employed by clinical neurophysiologists were insufficiently sensitive to evaluate the acute effects of solvents, such as were known to affect workers. Methods taken from experimental psychology proved to be more sensitive. In this context techniques from psychology were not used to evaluate the capacity of the individual; instead, the reactions and functions of the individual were used as an indicator of the harmful effects of the environment. In the earliest studies carried out by the National Institute of Occupational Health, the effects of short-term exposure were studied in the laboratory. The same methods were then used in field studies and in major epidemiological investigations. They have also been used in clinic contexts for diagnosing individuals suspected of having a chronic injury.

In 1970, the section for social engineering at the National Board for Technical Development established the interdisciplinary Working Environment Laboratory (AML) at the Royal Institute of Technology. Research concentrated on the design of the workplace (especially in the manufacturing industry) and on industrial hygiene, work organization and job content.

In 1976, the Working Environment Group (in the Department of Architecture at the Royal Institute of Technology) was established; in addition to architects, the group also includes behavioral scientists. Most projects have aimed at increasing the influence of employees in the actual planning of the working environment.

When the Technical Institute of Luleå opened in 1972, one of its main ambitions was to create a widely based department for work study. Today the college includes specialities in occupational social psychology and industrial psychology.

The Laboratory for Clinical Stress Research (Karolinska Institute) and the University of Stockholm, Department of Psychology, were, and are major centers for behavioral science research into working conditions. Initially (early 1960's) the emphasis at the Stress

Laboratory was upon the limits of human adaptation, especially as they might be relevant to the military. Towards the end of the 1960's much of this work - for example on biological rhythms and associated issues of psychophysiological function such as shift work research - were readily transferred to concerns with the work environment. Both the general methodology and theory were in place. Later, the Stress Laboratory became engaged in other forms of social research, such as evaluating the physiological "stress responses" in various occupational groups, such as teachers.

At the University of Stockholm basic research on psycho-biological aspects of stress, was performed during the early 1960's. This biological approach was linked to the social psychological orientation. For example Bertil Gardell and colleagues, in the mid 70's, attempted to elucidate the qualitative and quantitative characteristics of both over and under loading in working life (i.e. what characterizes over and under stimulation for workers). A main objective was to determine the mechanisms which can explain the long term consequences of these factors in health.

FORMATION OF THE SWEDISH WORK ENVIRONMENT FUND - 1972

The Work Environment Fund was founded in 1972. It has been the main source of financial support for behavioral science research into working life.

The Fund is financed by means of a special tax levied on all employers. Approximately twenty-five per cent of the funds are used in grants for research and development projects. The remainder is used for various training and information services. Approximately twenty per cent of the present allocation of 100 million kronor goes to behavioral and social science research.

To plan the work of the Fund, the Minister of Health and Social Affairs commissioned a report in 1972, which identified eleven problem areas in need of research:

Industrial toxicology

Technology for eliminating air pollutants

Noise

Climatic problems (e.g. cold and draughts)

Work organization and work content

Back problems

Accidents

Working conditions in the health and social services (physical, social and psychological problems and working hours)

The length and disposition of working hours

Absenteeism and staff turnover

Problems of the senior and middle-aged work force

In 1976, the Fund extended its interests to include new research. The reason for this was that the government, in conjunction with the introduction of its Bill on Co-determination at work, decided that it should be related on research into working conditions. It was also suggested that the Fund should fund research on employee co-determination, into the problems of individuals at work and the associated problems of work organization.

THE CENTER FOR WORKING LIFE RESEARCH (ALC) IS FORMED

With the passage of the 1976 Act of Co-determination at work (MBL) the Government also decided to establish ALC (The Centre for Working Life Research). It is a special institute for applied research in the field of working life. The Social Democrats and trade unions had made it clear that the main thrust of ALC's work should be the democratization of the workplace, in keeping with the aspirations of the Act.

At the Center for Working Life, there is research on co-determination, the public sector, and management questions. Both academics and non-academics (such as trade union experts) can have positions at the center, and can direct research. This use of non-academic directors of research permits the center to form closer links with working life.

Today, the Centre for Working Life (ALC) is by far the largest Swedish behavioral/social science and occupational research center. Some seventy researchers are employed at ALC, with a great variety of backgrounds. This reflects the emphasis on applied and interdisciplinary research which were influential at the time the center was established.

ALC has also carried out projects concerned with computerization, new technology and other problems associated with work organization. In addition, ALC also provides support for documentation, education, training, and seminars. ALC is also involved in establishing collaboration with other research bodies in the field.

In the discussions that took place during the formation of ALC, attention was drawn to the need for practical, applied social science. One of the terms used in this context was 'action' research. This means that the relevant groups of personnel in companies and organizations should play an active and more direct role in the combined research and development work.

Since the 1960's, the matters have changed dramatically in the field of working life research in Sweden. Radical questioning of the fundamental values and conditions, including research in general and occupational research in particular occurred. Above all, occupational research was criticized for being in the hands of the employers and used as an instrument for manipulating workers. Psychology and sociology were also criticized on the grounds that a narrow academic ideology was dominating research.

The human-relations movement, selection procedures and the issue of contentment at work, steadily declined in importance, and controversial social issues with links to European traditions gained a greater influence. Another major shift was the growing interest in research spelled out by labour unions. Even in research following traditional lines, growing attention was paid to the consequences for the employees of working conditions. Psychophysicologists started to use their methods to study the problems associated with stress at work and working hours.

An important manifestation of this growing interest in the working environment was the establishment of the Work Environment Fund.