

UNCLASSIFIED

AD NUMBER: AD0805639

LIMITATION CHANGES

TO:

Approved for public release; distribution is unlimited.

FROM:

Distribution authorized to U.S. Government agencies and their contractors; Export Controlled; 20 Dec 1966. Other requests shall be referred to Office of Naval Research, Arlington, VA 22203.

AUTHORITY

ONR ltr dtd 8 Jun 1971

805639

OFFICE OF NAVAL RESEARCH

BRANCH OFFICE

LONDON, ENGLAND

TECHNICAL REPORT
ONRL-51-66

This document is issued for information purposes on the understanding that it is not a part of the scientific literature and will not be cited, abstracted, or reprinted.

PSYCHOLOGY AT THE TECHNICAL UNIVERSITY
OF NORWAY, TRONDHEIM

BY

JOHN E. RASMUSSEN

20 December 1966



In addition to security requirements which must be met, this document is subject to special export controls and each transmittal to foreign governments or foreign nationals may be made only with prior approval of the Commanding Officer, Office of Naval Research Branch Office, Box 39, FPO New York, 09510.

I N D E X

	<u>Page</u>
INTRODUCTION	1
THE INSTITUTE OF PSYCHOLOGY AND SOCIAL RESEARCH	1
Academic Program	2
Research	4
Summary Comments	5
THE INSTITUTE FOR INDUSTRIAL SOCIAL RESEARCH	6
Organization and Philosophy	6
Research Program	7
Engineering Education Project	8
Industrial Democracy Project	11
CONCLUDING COMMENTS	16

BLANK PAGE

PSYCHOLOGY AT THE TECHNICAL UNIVERSITY
OF NORWAY, TRONDHEIM

Trondheim is a relatively small, moderately isolated, but important city in the north of Norway. Many streets are unpaved, and there is a curious atmosphere of the primitive blended with wealth. In the sunlight (and there were five consecutive days of warm and sunny weather in June this year) the city is quite intriguing. The brightly painted houses set in the valley and surrounding hills, the stately cathedral and university, the deep-green grass, flowers, and water all merge to give the city a quaint charm; a charm which may not be maintained with the increased industrialization and addition of modern office and apartment buildings. At one time Trondheim was the capital of Norway, and the King still maintains a rather unpretentious wooden house in the center of the city. It remains the gateway to the far North.

The Technical University of Trondheim was established in 1910, and is the only institution in Norway which grants degrees in engineering and architecture. Entrance standards are high and competition for admission is keen. There are a number of new buildings and more are being constructed.

It is somewhat surprising to find that there are two separate Psychology Institutes at the University, although only four courses are given in psychology, none of which are required; and there are no undergraduate majors. Moreover, it is intriguing to find graduate students in an Institute staffed by a single man.

INSTITUTE OF PSYCHOLOGY AND SOCIAL RESEARCH

The Institute of Psychology and Social Research was founded in January 1965 to provide the University with a formal capability in the behavioral sciences. The Norwegian from the North has been characterized as being somewhat slow and deliberate in making changes; and the University of Trondheim has a reputation, even in that part of the country, for being a conservative institution. Thus, all factors considered, the timing for formal introduction of psychology into the curriculum is just about right. By establishing a new Institute it was possible for the older Institute for Industrial Social Research to remain free from teaching responsibilities as well as to avoid the administrative complications of conducting research under University sponsorship.

Docent (Associate Professor) Julius Marek, who has been in charge of the Institute since its founding, is the only

fully trained staff member. In describing the organization and its activity, therefore, one essentially is speaking of Marek. Although he holds a permanent faculty appointment, he is not Norwegian. In fact, Marek was born in Poland, is an Australian citizen, and received his training in Australia, the US, and England. He lectures in English, writes in both English and Norwegian, and usually speaks to his Norwegian colleagues in English, inasmuch as they look upon such conversations as an opportunity to maintain proficiency. It might be noted in passing that this makes it easy for an English-speaking foreigner to join the faculty, but it also makes his mastery of Norwegian difficult.

Before coming to Norway two years ago to work in the Institute for Industrial Social Research, Marek was on the staff of the Tavistock Institute in London. Although originally trained in classical experimental and animal psychology, his exposure to the Tavistock and a PhD from the London School of Economics have resulted in a strong leaning toward the development and application of social psychology theory in the study of industrial organizations. He also has an interest in community planning problems, consumer research, and the psychology of perception.

While at the Tavistock Marek became interested in problems of industrial automation and worked extensively on the application of Trist's concept of the "socio-technical system" to this area. In addition to an early publication with Emery¹, a recent study of the interpersonal problems engendered in an actual factory by changing from a "batch" to a "flow" production line should appear soon². Here, Marek has attempted to elaborate the concept of "socio-technical system" through the application of Heider's balance theory.

Academic Program

The formal introduction of behavioral science into the Trondheim curriculum has proved to be a slow and difficult process. The problems appear to stem from reality factors

¹Emery, F.E. and Marek, J., Some Socio-Technical Aspects of Automation, *Human Relations*, 15, 17-25 (1962)

²Marek, J., Social and Psychological Responses to Changing Environmental Demands, unpublished manuscript.

rather than significant resistance on the part of other faculty members or departments. Basically, the students already are heavily loaded with engineering and/or architectural subjects and a major reorganization of the total curriculum will be necessary if psychology becomes either a required or credit-bearing elective subject.

Marek's aim in developing a behavioral science course at the University is to modify the present concept of "technical" or engineering training so as to include a consideration of social or human problems. On the one hand, this is an attempt to instill a sensitivity to man - machine interface problems in engineers from the beginning of their training. Marek's goals go beyond this aspect as he is concerned that engineers gain an understanding of the human aspects of technological or industrial organizations and processes. This latter aim is justified on the basis of data which indicates that a major portion of the engineer's professional career will be spent on nontechnical problems.

Within the past 18 months four courses have been developed. These may be taken in addition to the student's normal workload. Although no academic credit is given, a record is made of enrollment on the student's transcript. The present courses are:

Problems of Work -- An introduction to labor-management relationships given in conjunction with the Economics Department.

Psychology of Management and Organization -- In addition to lectures there is a practicum where role-playing situations are utilized.

Methods of Behavioral Sciences -- A basic survey of how man-machine and organizational problems are approached in industrial settings.

Post-Graduate Seminar -- Graduate students are exposed to an intensive individual tutorial program in industrial psychology and sociology with a wide range of required readings.

Obviously, the formal academic program has just gotten underway at Trondheim. During the past year approximately ten students volunteered for each course. With the passing of time, it is anticipated that the courses definitely will be offered on an elective basis for formal credit; and courses in behavioral science ultimately may be required. A number of engineering students have chosen to do their final under-

graduate theses with Marek and he now has two graduate students, both of whom have degrees in engineering. Graduate work in psychology is limited to a degree roughly comparable to the US master's.

Research

Research at the Institute of Psychology and Social Research is more a matter of plans than reality. Marek's orientation to research is identical to that found at the other Trondheim Psychology Institute. Moreover, there is a total overlap in at least one area of interest -- the impact of automation in industry.

Plans are well along to begin a series of studies in regional development, which will become the first active research program area. Of concern here is the devising of procedures or techniques which will facilitate the individual's transition from the traditional role of peasant farmers or fishermen during the industrialization of rural areas. Previous experience in Norway has shown that this transition often is extremely difficult and the rural workers tend both to be "lost" in industrial roles and less productive than their urban counterparts. Marek is approaching this problem with a Tavistock "socio-technical system" orientation, and hopes to maximize production by making organizational and process changes in the factory which will better adapt the technical side of the industry to needs of the workers.

A related project is one concerned both with the development and the control of the tourist industry in Norway. While the tourist industry is a highly important source of income to the Norwegians, there also is a concern that it will over-run the country and spoil the natural beauty. The problem becomes one of identifying the different patterns of tourist interest and behavior, particularly with regard to outdoor activities such as ski-ing and developing facilities which will attract tourists to given areas. This problem will be approached through comparison of successful and unsuccessful tourist areas to identify different patterns of activity and of space utilization.

A final project in the regional development research program will be concerned with problems arising in the transition of the food industry in rural areas from a farmer-consumer relationship to an industrial food conversion and packaging process. Here again, the concept of the socio-technical system will be involved. Thus, it is not enough that a job analysis be made of the various operations required to process the food

and people be hired to fill the positions. In rural Norway the very introduction of food processing or conversion constitutes a changed way of life. Thus, attention must be given to adapting the organizational procedures so that the resulting interpersonal or social organization is such as to increase maximum productivity from workers drawn from a rural, peasant population.

A second major research program area which Marek has outlined for eventual entry is that of consumer research, broadly defined. While his plans and financial commitments are less well structured here than in the rural development program, he hopes to start with studies in the packaging and display of consumer goods. From casual shopping and browsing in Norwegian stores, this appears to be a virtually untouched area. Finally, Marek hopes to continue his previous studies in automation. Here he is particularly interested in changes in the shipbuilding industry.

Summary Comments:

One's initial response to the program of Marek's Institute may well be one of scepticism. In many ways the program outlined above appears to be overly expansive and maybe overly optimistic. Possibly this is true. However, Marek is far from naive in approaching his goals. He has attempted to establish aims for his Institute which are relatively well defined and interrelated. From there he is systematically starting at the beginning. He personally will initiate the studies of rural development, working with a separate graduate student on each project. As soon as the student is capable of taking over one project, Marek will start on the next. He would openly welcome foreign post-doctoral workers, particularly those who speak Norwegian.

The academic or teaching responsibilities of necessity will grow quite slowly because of the problems in expanding the curriculum in an engineering school. Thus, there is ample opportunity to recruit additional faculty members. The University has been quite cooperative and supportive of its new Institute. Space is plentiful, data processing equipment is available, secretarial services adequate (something which is unusual in Europe), and financing adequate. Research funds come from a number of different sources, both state and private. Unfortunately, library facilities are limited.

It will be interesting to see if the enthusiasm and drive of a dedicated and capable docent, coupled with an interest on the part of the University, can offset all of the

negative factors which are brought about by rather extreme geographical and professional isolation.

THE INSTITUTE FOR INDUSTRIAL SOCIAL RESEARCH

The Institute for Industrial Social Research was established in 1958 with funds donated by A/S Freia, a Norwegian chocolate manufacturer. Although the Institute is physically located on the campus of Trondheim University and has access to University facilities, it is a private, nonprofit organization.

The motivating force in both the founding of the Institute and its activity to date has been Einar Thorsrud, who worked as personnel manager for the Freia Corporation before going to Trondheim. The Technical University has provided a natural home for an organization of this nature, as the Institute's primary focus is on research concerned with the relationship of man to industrial processes and the place of the individual in the technological organization. In essence, the Institute is focused on problems beyond human engineering, and thus has a much broader interest than individual man-machine interface. One might even go so far as to say that the classical problems of human engineering really are not a matter of concern to this Institute, even though it is physically located on the ground of a major engineering school.

Organization and Philosophy

Today the Institute for Industrial Social Research is so heavily influenced by and intimately related to the Tavistock Institute in London that it has all the outward appearances of being a branch of the Tavistock, and this is partly in being through collaboration with Tavistock in a major research program. In fact, all that is lacking is the formal affiliation.

On June 1st this year Thorsrud resigned and moved to Oslo, where he is starting a new Institute. This is indeed a blow to the Trondheim group, as he has been an extremely effective administrator as well as a competent investigator. The great void left by his departure may be partially due to the fact that no one else in the organization really concerned themselves with administrative or fund raising details. Thorsrud's successor has not been selected. The over-all direction of the Institute has been placed in the hands of an executive board or council which includes Thorsrud, a representative of the University, and a number of other persons. The research program has been placed under the direction of Dr. Philip G. Herbst, a German trained in both sociology and psychology, who emigrated to Norway via the Tavistock. Daily administrative routines

will be handled by another staff member. The appointment of a new director will be somewhat of a problem as Trondheim is not the most desirable place in Norway to live. Moreover, a foreigner probably would find it difficult to assume the role of front-man with Norwegian industry.

In addition to Herbst, who is fairly well known in Europe, there is one other psychologist, Ad Stemerding, an emigrant from the Netherlands, who took his degree under Mulder. There are five other staff members whose basic degree is in engineering. Supporting staff members are hired as needed from the University student body.

Financially, the Institute is reported to be relatively secure. Money for equipment or related capital expenditure comes from interest on an investment fund set up by A/S Freia. Support for specific projects is obtained from a diversity of sources including the Norwegian National Research Council of Social Sciences.

While the Institute occupies spacious, well-equipped quarters in the imposing main building of the University, there are no laboratories. This stems from the basic philosophy of the group regarding research on industrial organization. Herbst, the present spokesman, expresses the position quite unequivocally. Human behavior in organizations and institutions, by definition, must be studied in a field setting. Experimental social psychology laboratory studies are considered to deal with such artificial, isolated, and restricted phenomena that one well may lose significant insights into the behavioral or organizational situation under study. This does not mean that in rejecting the university laboratory Herbst and his colleagues have rejected theory, experimental rigor, or sophisticated experimental designs. On the contrary, one cannot help but be impressed with their knowledge and understanding of the contemporary scene in social psychology. Their basic argument is with attempts to simulate the reality of an organization through the use of "groups" of university students which have no history and no future. The visitor to the Institute, it should be added, well might detect a somewhat greater interest in the technical or organizational half of the "socio-technical system" approach than in the dynamics or psychology of the individuals involved in the system.

Research Program

Historically, the work of the Institute began with studies of factors which influence the career structure of engineering students, and this research program has continued

to date. The second major program of the Institute over the last three years, carried out in collaboration with the Tavistock Institute, is known as the "Industrial Democracy Project." While these are considered separate programs and are funded from different sources, they actually are highly related. There are plans to start a study in the near future of the merchant marine ship as a 24-hour community. Only the first two major programs will be summarized here.

At this point it might be well to emphasize the highly programmatic nature of the research at this Institute. At present there are only two fully active study areas; however, even by US standards both of these are major undertakings and both involve collaboration with individuals in other countries. In addition to collaboration with the Tavistock Institute in London, there is a well-established working relationship with Professor Louis Davis of the University of California, Berkeley. One obtains the impression that no investigation is undertaken at this Institute unless it is directly related to other outgoing work and also fits into the total programmatic scheme. Thus, each investigation has an antecedent, and it can be anticipated (hopefully) that the results will help in formulating succeeding studies. Perhaps it is unnecessary to dwell upon this point; however, such a highly organized programmatic approach to research is not the general rule in European psychology.

Engineering Education Project

The training or education of engineers is seen as one aspect of a broader problem related to industrial psychology and organizational management rather than a problem of educational psychology. In essence, the purpose of this broad research program might be put as -- "How does one ensure optimal effectiveness of engineers in an industrial organization?"

The research is based on the premise that traditional approaches to recruitment, deployment, and utilization of highly educated personnel in the modern industrial organization are outmoded. So many complex forces related to market demands and/or technical development enter the picture that the traditional task or job analysis and training program requirements seldom have been completed before changes must be introduced. Ultimate progress in this area is considered to depend upon understanding the relationships between basic and professional education, between professional education and practice in industry, and finally between a given job, broad career patterns, and the society in which the individual is living.

A multitude of studies in both Norway and other countries have fed into the educational vector of the research.

Starting with students in the 15-19 years age group, studies have been carried out on the stability of interests as well as the actual process of structuring or focusing the interests of students in Norwegian school systems. It has been found that while interests are relatively stable during this age period -- in terms of broad categories such as science and engineering versus literature -- the emphasis in school appears to be focused primarily towards the short-term goals of passing required examinations. Students tend to postpone seeking relevant vocational information until they have taken the all-important matriculation examination which determines their eligibility for university entrance. On the basis of these studies it was concluded that Norwegian high school students are neither motivated nor guided toward seeking vocational information relevant to their aptitudes and ability for careers in engineering.

Another series of studies has been devoted to the question of how adequately university training in engineering prepares an individual for his subsequent professional life. Included here are investigations of the norms and values predominant among students and faculty members, the effect of university growth on the teaching-learning situation, and time allocated to different study activities. Interestingly enough, it was found that the actual program of study bore no relationship to the formal plan outlined by the university. Not only does a problem exist in actually integrating the basic sciences with laboratory work, but this is further compounded by a difference in student and faculty value systems. While not unique to the Norwegians, it would appear that the students demonstrate far more interest and concern with academic material, laboratory or otherwise, which they believe to be characteristic of engineering as a field of study and as a profession, while the faculty are far more concerned with academic-theoretical problems. At the same time it was found that there is little if any place in the present study program for consideration of the administrative and nonengineering problems which the student will face in industry. When this material is related to findings from studies in industry, it would appear that neither the present selection system for university training in engineering, the training focus, nor value systems of the students and faculty give adequate preparation for a career in engineering and transition from student to professional life. Further, the social and administrative values which characterize industry are largely ignored in the engineering curriculum.

These results might make it appear as though the training at the Technical University of Norway, as well as at the pre-university level, was of poor quality. As a matter of

perspective, this is definitely not true; Trondheim has an excellent reputation as an engineering school. However, it would appear that these studies have disclosed ways in which the training of engineers could be made more commensurate with their long-range career development.

A second broad group of studies has been directed toward obtaining a better understanding of the engineer and his career pattern in industry. To start, the position of engineers in Norwegian industry was analyzed against the context of their educational background and career development. Here a longitudinal study was made of graduates during a ten-year period of time. Approximately 65% of the graduates were employed in private industry and only 30% were employed on purely technical work at the time of the follow-up, a finding which was not necessarily unanticipated. A more important outcome of this study was the discovery that the procedures now employed by Norwegian industry for categorizing or describing activity in engineering are diffuse and grossly inadequate for research purposes. Thus, with such an unclear conceptualization of engineering jobs, a question is raised as to how it is possible to formulate company policy regarding recruitment, deployment, and utilization of engineers.

Other studies, using the case history method, were focused on the question of "What happens when companies advertise for engineers and jobs are filled?" Here, the above diffusion was highlighted. It was found that recruiting was directed microscopically towards specific jobs rather than being conducted within a framework of over-all company function and career development. Of particular significance it was found that the customary recruiting approaches placed the applicant in a conflict position in which he was required to choose between strictly professional activity with limited promotional opportunities or a broader range of field work that encompassed functions for which he was not trained, i.e., sales, research, etc.

This all fits very nicely with research done outside the primary Trondheim group. An example in point are Hertzberg's studies indicating that work content is a primary source of positive motivation in industry, while external work conditions may become the leading source of dissatisfaction. Here the research in the industrial area begins closely to overlap that on personality factors of engineers. Particularly germane at this point are Norwegian studies with regard to conflict of values brought about by discrepancies between the job content and personal value orientation.

The work grossly summarized above has been focused generally on translating the problem which exists into researchable terms. One of the more significant factors to set this broad research program apart from similar studies elsewhere is the possibility of implementing experimental studies which are an outgrowth of the basic or survey phases of the program. There is an excellent relationship with the engineering school, the highly dynamic Norwegian professional engineering societies, and with a number of industries.

Continuing surveys of approximately 20 Norwegian corporations are being made through the Engineering Society to determine structural changes in professional careers over a period of time. In addition, programs have been instituted through the professional societies to supplement formal university education and thus compensate for areas previously neglected in the technological studies. With the cooperation of both Norwegian industry and the labor unions, a series of major investigations have been launched on the effective utilization of professional engineers in large corporations. This work is based on the Tavistock Institute's socio-technical model. The basic goal of the research has been to increase the individual's feeling of participation in and hence satisfaction with vocational activity in industry. It is hypothesized that this, in turn, will lead to an increased level of individual effectiveness in the work situation.

Industrial Democracy Project

The second broad research area of the Institute for Industrial Social Research is known as the "Industrial Democracy Project." This began in 1962 at the joint request of the Norwegian Federation of Employers and the Trade Union Congress, both of whom contribute to the financial support of the projected ten-year effort. The idea for the project was first proposed by Mr. Olav Bruvik, the late Norwegian Minister of Social Affairs, and it would appear that there were both political and reality factors behind its establishment. The political factors were concerned with broad issues of social democracy in Norway and reality factors were an outgrowth of the realization that Norwegian industries must capitalize upon the potential of their workers to help compensate for the economic handicaps resulting from the country's limited natural resources.

The objective of the study, translated directly from the Norwegian, is "Under what conditions can more rights and responsibilities be achieved for the individual in the workplace?" On the basis of rather extensive discussions with the investigators, it would appear that a somewhat more lucid

translation of the goals would be to determine the conditions under which the individual is given greater control over his own particular job task or function and at the same time assume greater responsibility in the industrial organization where he is employed.

The Industrial Democracy Project is divided into two distinct phases. The first, which required approximately three years to complete, provided the background for the actual experiments which now are being carried out in the second phase of the program.³ A voluminous report on phase A has been published in Norwegian, and an English translation of this monograph recently has been undertaken. Work on phase B of the project, the experimental phase, is still under way.

The work commenced with a systematic search of popular and technical literature in an effort to define and understand the concept of industrial democracy as it is currently used in Norway. This proved to be exceedingly difficult as it would appear that there is no universally accepted formulation of the concept. Remembering that Norway is a socialistic country, fiercely concerned with democracy and individual rights, it is not surprising that the concept carries certain philosophical and political-economic connotations. At the same time it carries an equally strong -- possibly even stronger -- connotation of optimizing the productivity and efficiency of industrial organizations. The concept has been used to describe the formal representation of labor in company management schemes, and it has also been applied to the conditions of job structure and task organization in which the individual worker participates in the broader industrial setting.

Next, an extensive investigation was made of formal employee representation in the management framework of Norwegian industry. The literature reporting similar work in Yugoslavia, West Germany, and Great Britain also was analyzed. While it was recognized that the findings from other countries could not be generalized to Norwegian industry, they do provide a broader background context in which to evaluate the more detailed Norwegian studies.

The study of employee representation on Norwegian management boards was made with the cooperation of a joint

³Fred Emery and Einar Thorsrud, "Industrielt demokrati-representasjon På styreplan i Eedriftene?", Oslo University Press, 1964

management - trade union committee which selected four corporations for study. Following a rather comprehensive interview schedule, data were collected both from representatives from the executive or management side of the board and from employees who had served as board members. In all 30 people, including the managing director and a minimum of two or three persons in each corporation with leading roles on the board, were interviewed. The remainder of the subjects were employee representatives to the board. In the case of management personnel, two or three members of the research staff were present at the interview and all took notes which later were combined and condensed into a single written report. The employee interviews were recorded on tape and transcribed verbatim. In every case the interview schedule was rather closely adhered to, at times necessitating more than one meeting with a given individual. In addition, information was available from the written records of formal board meetings. The monograph on the first phase of the Industrial Democracy Project presents a detailed analysis of the interview and management record data. This report is quite penetrating and very lucidly presents the problems which characterize employee representation on industrial corporation boards.

Although the findings are too lengthy to summarize here, the data very clearly indicate that employee representation on Norwegian management boards is not an effective means of accomplishing the goals toward which the Industrial Democracy Project is directed. An employee may overcome the social-psychological problems of being the outsider in a group with different socio-economic backgrounds, value systems, and perceptual sets within a period of one or two years. However, the reality constraints imposed by the industrial and financial aspects of management often are in sufficient objective conflict with worker goals so as to minimize the impact of employee participation. Likewise, the results of the foreign studies which were reviewed indicated that the worker participation in industrial management boards did not in a single case serve the purpose for which it was intended.

A number of mechanisms for enhancing communications between the employees and management and hence solving many internal corporation problems became apparent during the study. At the same time, however, it was evident that neither these mechanisms nor the representational systems have the degree of influence desired on the over-all efficiency of the organization. If "industrial democracy" employee participation in management is to become meaningful, it must occur at a level at which large numbers of employees are both able and willing to participate. In essence this dictates shifting attention from

the board level to individual jobs. The notion here is to devise conditions which both change the worker's perception of his job and increase the degree of control which he is able to exercise over his individual work situation. Thus, one comes back to the basic Tavistock socio-technical theoretical model to which the Trondheim Institute is dedicated.

Phase B of the study is concerned with actual experimental attempts to create conditions under which workers have an increased degree of control and responsibility in the job situation. The strategy is basically twofold: job enlargement through a systematic task analysis; and, reorganization of task functions so as to develop autonomous working groups. In essence, the studies in phase B are concerned with job design and development of new jobs. One experiment has been completed in the wire-drawing section of a Norwegian metal industry and a second currently is under way in a pulp and paper factory.

The wire-drawing section of the metal factory was selected for study after long and extensive union-management discussions. In this particular department there is no inter-dependence between workers, each man has his own workbench, and he has no responsibility for production activity aside from his own job. There is little social interaction with workers except for infrequent contact with machine maintenance men. At times, because of breakdowns or delays along the production line, a particular worker will be practically inactive. Pay is on a basis of productivity, although a standard rate is used when the machine is not operating.

A carefully drawn-up experimental design was formulated for the study whereby men would work in groups of four and each group would be responsible for the functioning of seven machines. Two shifts of workers participated so as to provide replication. Output and earnings of the preceding ten weeks were taken as a baseline measure of productivity.

In spite of the cooperation which the unions had given to embarking upon this project, they refused to cooperate with the experimental design as formulated. First the union insisted that the seven workbenches chosen for the experiment should be manned by at least six men rather than the four which were desired by the investigators. In addition, many of the workers were poorly motivated at the start of the study and were passive participants at best.

Within a matter of days the study became plagued with difficulty because of a concern on the part of the workers over being viewed by their fellow union members as "rate breakers" and

because of the fact that the men did not feel comfortable working in the group situation. After four weeks it was halted, two groups of genuine volunteers were assembled, and another try was made to collect data. To a certain extent the problem of incentive was resolved through discussions with the union. However, the conditions of optimal manning were not fulfilled except for one brief period when a worker was absent. In fact, there was only one brief period, in one group, where the experimental conditions were even close to being fulfilled. Productivity clearly was increased in this situation. For the most part, however, productivity was lower during the experimental than during the base-line period.

If the results of the wire-drawing department study were considered to be a crucial test of the Trondheim group's theoretical position, one might rapidly lose interest in the work. In reviewing the data and the sequence of events which transpired during the study, it becomes abundantly evident that one can draw few conclusions since the experiment never actually got off the ground. In fact, this might well be considered one of those cases where an experiment contributes more to the education of the investigators than it does to advancing scientific knowledge.

Months of negotiation had gone into laying the ground for the study. It had the support of both management and the union in the particular factory where it was carried out. In fact, as mentioned earlier, this work was undertaken at the request of and was financed by a Norwegian labor-management group. It is hard to imagine more ideal conditions for undertaking field work of this nature. At the same time, and in spite of the progressive and supportive attitude of the sponsors at the abstract level, implementation of the research was a different matter. It would appear as if the entire experimental procedure was neither fully comprehended nor accepted by the lower-level employees for whom it was designed to assist. One obtains the impression that the experiment struck at the very core of the industrial or union tradition and value system of the shop employees. Moreover, it would appear that union mores and traditions are far more firmly entrenched among some highly-skilled Norwegian workers than the investigators, management, or even the union leaders imagined.

The usual consequence of a situation of this nature is to terminate the study. Such was not the case here. It would appear that Thorsrud and his colleagues had established sufficient rapport with the sponsors to retain their interest and capitalize upon their positive motivation. Thus, the experience was used as a basis of discussion for future

experiments and changes within the factory.

Studies which essentially duplicate that described above now are under way both in an Oslo paper factory and a steel plant in Kristiansand. Profiting from the experience in the first wire-drawing department experience, these have not collapsed. However, it is too early to draw conclusions from the data.

SUMMARY COMMENTS

It is difficult to spend any length of time with the Trondheim groups without becoming at least mildly infected with their optimism, enthusiasm, and broad theoretical position. On occasion one might have a fleeting thought that they are biting off more than they can chew and do not have the proper resources to undertake studies of the magnitude and scope which characterize their present research. Also, one might wish to see more fully trained investigators engaged in the work. To a large extent, however, these concerns are offset by the close collaboration which has been established with the Tavistock group in London.

A more serious concern is a somewhat vague feeling (possibly unwarranted) that there may be a tendency to interpret and generalize beyond the limits of their data. Moreover, while much of the work discussed above has been written, it might be desirable if there were fewer mimeographed reports and more publication in the technical literature. One also wonders how long the two Institutes will be able to justify their existence as separate organizations in a small and professionally isolated setting.

Foreigners, particularly Americans, might be taken aback by the aura of idealism or "cause" which on first contact appears to surround the concept of industrial democracy. However, upon reflection, it would seem that much of the emphasis placed on the concept per se is dictated by grantmanship and the prevailing tenor of the Norwegian industrial community. The actual research of the Trondheim groups easily can stand on its own merits in the areas of industrial and social psychology. In fact, it may be the very flexibility inherent in the Norwegian attitude of industrial democracy which will permit the modification of traditional labor and management positions necessary to carry out the type of research with which the Trondheim Institutes are concerned.

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Office of Naval Research, Branch Office London, England		2a. REPORT SECURITY CLASSIFICATION	
		2b. GROUP	
3. REPORT TITLE PSYCHOLOGY AT THE TECHNICAL UNIVERSITY OF NORWAY, TRONDHEIM			
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) N.A.			
5. AUTHOR(S) (Last name, first name, initial) RASMUSSEN, John E.			
6. REPORT DATE 20 December 1966		7a. TOTAL NO. OF PAGES 16	7b. NO. OF REFS 3
8a. CONTRACT OR GRANT NO. N.A.		8a. ORIGINATOR'S REPORT NUMBER(S) ONRL-51-66	
b. PROJECT NO.		8b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) N.A.	
c. N.A.			
d.			
10. AVAILABILITY/LIMITATION NOTICES This document is subject to special export controls & each transmittal to foreign governments or foreign nationals may be made only with prior approval of the Office of Naval Research Branch Office, Box 39, FPO, New York 09510.			
11. SUPPLEMENTARY NOTES N.A.		12. SPONSORING MILITARY ACTIVITY N.A.	
13. ABSTRACT Summary of organizational and current research activity at the Institute of Psychology and Social Research and the Institute for Industrial Social Research at Trondheim, Norway.			

Security Classification

14	KEY WORDS	LINK A		LINK B		LINK C	
		ROLE	WT	ROLE	WT	ROLE	WT
Psychology Organizational Psychology Institute of Psychology and Social Research, Trondheim Institute for Industrial Social Research, Trondheim Norway							

INSTRUCTIONS

1. **ORIGINATING ACTIVITY:** Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organization (*corporate author*) issuing the report.

2a. **REPORT SECURITY CLASSIFICATION:** Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.

2b. **GROUP:** Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.

3. **REPORT TITLE:** Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show title classification in all capitals in parenthesis immediately following the title.

4. **DESCRIPTIVE NOTES:** If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.

5. **AUTHOR(S):** Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.

6. **REPORT DATE:** Enter the date of the report as day, month, year, or month, year. If more than one date appears on the report, use date of publication.

7a. **TOTAL NUMBER OF PAGES:** The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

7b. **NUMBER OF REFERENCES:** Enter the total number of references cited in the report.

8a. **CONTRACT OR GRANT NUMBER:** If appropriate, enter the applicable number of the contract or grant under which the report was written.

8b, 8c, & 8d. **PROJECT NUMBER:** Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.

9a. **ORIGINATOR'S REPORT NUMBER(S):** Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.

9b. **OTHER REPORT NUMBER(S):** If the report has been assigned any other report numbers (*either by the originator or by the sponsor*), also enter this number(s).

10. **AVAILABILITY/LIMITATION NOTICES:** Enter any limitations on further dissemination of the report, other than those

imposed by security classification, using standard statements such as:

- (1) "Qualified requesters may obtain copies of this report from DDC."
- (2) "Foreign announcement and dissemination of this report by DDC is not authorized."
- (3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through _____."
- (4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through _____."
- (5) "All distribution of this report is controlled. Qualified DDC users shall request through _____."

If the report has been furnished to the Office of Technical Services, Department of Commerce, for sale to the public, indicate this fact and enter the price, if known.

11. **SUPPLEMENTARY NOTES:** Use for additional explanatory notes.

12. **SPONSORING MILITARY ACTIVITY:** Enter the name of the departmental project office or laboratory sponsoring (*paying for*) the research and development. Include address.

13. **ABSTRACT:** Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as (TS), (S), (C), or (U).

There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

14. **KEY WORDS:** Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, roles, and weights is optional.

UNCLASSIFIED

Security Classification