R E S E A R C H   M A N A G E M E N T .

C. V. S m i t h.

RESEARCH MANAGEMENT.

The object of this essay is to examine the various factors affect-
ing the type of management needed in research and how it differs
between the Universities and Industry. The nature of management is
briefly examined to show how research management places different
emphases on the various aspects of it.

First of all, the nature of management is outlined so as to
define the sphere of management. This is followed by an attempt to
define research and to enumerate the characteristics of research
workers. These characteristics are then examined to see what problems
they present and how management can best handle them. Intimately
connected with these characteristics is also the environment in which
researchers work. Finally, the differences between research and normal
management are elucidated.

Management can be split into five basic activities, all being
required in some form to produce effective management. These are the
setting of standards and objectives, organising, providing the
motivational forces for those being managed, ensuring that progress
is being made and providing adequate development of personnel.

The setting of standards and objectives consists of the establish-
ment of the overall purpose of the work, the fixing of specific
targets and the setting of performance standards.

Organising is one of the major components of effective management.
First the aim of the work must be established as organising is goal
oriented. It should involve the identification of resources - including
manpower, and ensure their full utilisation, availability and correct
allocation.

Another important component of management is motivation. This includes

the provision of adequate leadership and working incentives to create
an environment that is conducive to work and which will aid the
worker's morale and producing abilities as well as removing any
obstacles.

The ensuring of progress is a vital keypoint in the management
cycle. It requires the monitoring of the work as it progresses to
provide feedback so that any corrective action can be taken. if
necessary.

The final activity, the development and training of people, whilst
its effect is not generally short term (i.e. 6 - 9 months), it is
something that must be accomplished to ensure possible future
progress and advancement. It involves the provision the education and
training of people to enhance their work potential, as well as preparing
them for future promotion, especially into management.

These then constitute the nature of management and its function.
Management is needed in research but what factors affect or modify it?

Research is the systematic search for and creation of new know-
ledge and ideas. Hence, the research worker will be highly creative,
highly trained and intelligent. Industrial research is linked with the
aims of the parent organisation and helps it to make a profit. The
results are more often than not judged by laymen. On the other hand
research in the Universities is non-profitmaking and is usually
linked with the specialisations of the various constituent departments.
Normally it is judged by one's own peers but some of the research in
the Technical Universities is done in collaboration with Industry and
so the aims and achievements of this research are judged partly as
a piece of industrial work and a piece of university research.

As mentioned previously, the research worker is a creative being

and, as such, the environment in which he works should foster this ability. The atmosphere in which he works should be as free as possible and this is something that is more easily obtainable in the Universities, e.g. freedom of working hours. The environment is also greatly influenced by the research manager and he can help to shape it to suit all concerned. Besides creativity, the research worker does exhibit other traits, all of which help to distinguish him from the normal skilled worker. It would therefore appear that managers and supervisors must be able to identify these in order to create an environment that is conducive to the nature of the researcher's work.

One of the most outstanding features in research work, compared with normal production work, is the motivational aspect. Research scientists and engineers, both in Industry and University, are basically career oriented. Satisfaction in their work, in what they do and what they achieve and the possibility of creating new knowledge are their principal goals. Whilst in many jobs some of these aims are important, they are especially so to the researcher as they enhance his standing in the company and in his profession. It would therefore appear that, assuming that work is under way and progressing, for the researcher management becomes a bystander as motivation is self-created. In Universities there is probably even more self-created motivation as researchers are usually striving to obtain some higher degree. In industrial research most of the work is guided by the aims of the company so that there is probably not quite so much self-satisfaction as in university research. A certain amount of motivation is needed, however, at various stages of the work - notably at the beginning although a certain amount of coercion is needed in Industry to guide a project in the right direction but too

much is dangerous.

An important difference between University and Industry which affects the type of management needed, is how the research is carried out. In Universities most of the work is individually oriented — the people usually concerned being the junior researcher and his supervisor. It is therefore easier to have closer personal contact between the two. In Industry, however, much of the work is on a larger scale and needs team work, thus involving much larger amounts of invested capital. There is also some difference in what the two paths of research are aimed at. In the University, besides doing research, the young researcher is also being trained in the methods of research, whereas in industry both trained and untrained people are being used to produce a system or product to help the company make a profit. It would therefore seem that more individual tuition is needed in the University. With team work, much personal contact is lost between the individual researcher and manager but the researchers do act as catalysts amongst one another. In Industry the manager in research then takes much more of a coordinating role as his span of responsibility is much wider but at the same time, like the university supervisor, he must be conversant both with the main and allied technical fields involved.

The research manager in Industry must also keep the team informed of the present state of progress of the project as well as any difficulties arising. This helps to create a sense of 'belonging' to all involved — the opposite of which quickly generates frustration, lowers morale and affects the work itself.

Apart from providing the focal point for a team or teams, research management must also provide communication channels — both horizontally and vertically in the company structure. This is applicable in

Universities and Industry, especially if they are large. Failure in communications is also dangerous for morale and quickly causes false rumours and antagonism. It also helps to induce a sense of insecurity and generates inefficiency and wasted effort. The communication channels, as well as providing a downward flow for information and commands, must also be able to provide feedback both quickly and accurately. Those in charge have a responsibility to keep these channels open at all times.

Because of the nature of research, the research worker has an inquisitive and enquiring mind. Hence all decisions involving him must be well founded and explainable. There should also be ample opportunity for the research worker to express himself on policy decisions affecting him. Lack of explanation is particularly irritating to the researcher and he will become vociferous and resentful at the way he is being treated by the administration. This then requires a tactful supervisor or manager to clear up the situation which should never have been allowed to happen in the first place. A parallel situation exists when there is excessive 'red tape', something which can easily happen in a large organisation. On the other hand, research workers are usually very appreciative of good administration which does not shackle them too closely and will probably comment on it.

One of the fundamental difficulties in research administration is a widespread lack of understanding of human relations and the skill to deal with such problems. This problem, and that in the previous paragraph, apart from other technical considerations, are good advertisements for research managers to be people who have been deeply involved in research. They should also have had adequate management training. In this way they should be able to cope with and foresee some of the human relation problems arising. In like

manner, they should also be able to deal with the idiosyncracies of the researchers, the intellectual conflicts experienced, the need for challenging work, the desire for recognition and status and the overall frankness with which the researcher will discuss his problems.

One of the main functions of a supervisor or manager, apart from looking after his staff, is the sifting of ideas generated within his department. He must help provide recognition for good ideas as well as conveying them to more senior levels of management and other interested parties. The manager or supervisor must be willing to accept new ideas although he may not fully understand the principles. New ideas should not be quashed in their early stages as at this stage they may not have a very logical basis and undue criticism could be the death of what otherwise may have been a fruitful idea.

The nature of research also demands that personnel require time for reading, thinking and attending meetings so that they can keep abreast of developments in their particular specialities and associated fields. The writing of papers and attendance at meetings helps to get a researcher respect as well as providing an opportunity for meeting people working in similar fields. Research management should recognise these needs and encourage them as the company or university will benefit from them but they should never reach a point where they are abused.

Besides the everyday running of the departments, managers must be intimately connected with the selection and development of staff. The future requirements of the company must be borne in mind and, in conjunction with the Personnel Department, managers must make preparations for future commitments. Apart from purely technical courses, people destined for future managerial posts must be trained in the new skills required and allowed early participation in the

running of the department - i.e. the delegation of authority and responsibility. The selection of staff must be so that particular jobs or projects have as high as possible chance of success.

An important duty the research manager has to higher management is the planning and scheduling of projects. Much of what goes on in the research department is deeply involved in long and short term company planning and so keeping projects as near as possible to schedule is important. The research manager, whilst imposing dates and deadlines on projects, must give the researcher as free as hand as possible in the planning between dates to provide maximum flexibility. This is something readily realised in University research (e.g. three years overall for a Ph.D.) and gives the junior researcher complete flexibility in planning his work.

Above are outlined some of the important aspects of the research manager's job and how different factors affect it. It is clear that management is needed both in the Universities and Industry, although the style of management is slightly different in the two organisations. All the five points mentioned previously in the discussion on the nature of management are needed. Whilst objectives remain basically the same, standards imposed are generally limited by technical considerations, as opposed to human ones, or determined professionally by the researcher in his work.

The motivation of researchers is different to that of the normal skilled or unskilled worker. Here, most of the motivation is self-created and so the need for stimuli from the manager or supervisor is decreased. The manager has a responsibility nevertheless for creating an environment that is congenial to research work and providing initial motivation for the work.

The ensuring of progress and the education and training of

research workers follows similar patterns to those of any other
department except that researchers are likely to take high technical
posts.

It is the manager or supervisor that provides or helps to provide
the communication channels and the coordination and interlocking
between teams and people. Hence the style of management he uses is
naturally a decisive factor in how his subordinates react towards
him. It would therefore appear that a participative form of management
is the best in research departments - an authoritarian form quickly
offending the researcher. Participation makes the researcher more
aware of his responsibility to the environment in which he works and
should also result in more effective work, a broader acceptance of
the organisational goals and a greater motivation to get things done.
Thus in research management the manager has much more of a liaison
role than in normal management. The one important thing he should
realise is that human relations play a vital role in any form of
management, especially in research. Thus, where large interdisciplinary
teams are concerned the research manager has no mean task at hand.

Research management should therefore be as flexible as possible in
order to obtain the fullest potential from its staff and acknowledge
that man is its greatest resource and should be treated as such. The
managers themselves must also be technically qualified and if possible
come from a research background.

If research management adheres to the principles outlined here
it is fulfilling its aims to its professional technical people as
well as incorporating the maximum number of goals of the organisation
with those of its staff.