

R. S. R. S.

Newsletter

Once again with this Christmas number of the Newsletter I welcome the opportunity to send seasonal greetings to all members of the Station, both at home and overseas.

Since last Christmas we have changed our name to indicate more clearly what our activities are, and we have moved smoothly from our old position in D.S.I R. to our new position in the Science Research Council. I think it is clear that, from the point of view of the Station's work, this has been a happy change and we can all look forward with confidence to energetic support of our activities in the future.

The Chancellor's brake on the National expenditure must, of course have its effect on us, but when the brake can be released, as we all hope it can soon, we shall find ourselves well placed to undertake the researches appropriate to our new name. Until then we are by no means short of facilities and many new and important advances will I believe, be made during 1966. May the New Year bring every success to the Station and happiness to all who work in it.

J. A. Ratcliffe

Research Organisation for Adequate Creative Freedom

√The following consists of extracts from a recent article¹ by Dr. J. G. Pearce, a leading O.E.C.D. consultant on research management and is reproduced with acknowledgements to the Institute of Physics and the Physical Society. One may or may not agree with the author's views. Many of us, nevertheless, who are occupied with scientific tactics, are always interested in the strategic problems which must be solved if work is to advance. ED 7

The problem of the research scientist

If we ask why the research scientist needs special treatment in formal administration and management courses, it is because by choice of vocation he is temperamentally an individualist, indisposed to a regimentation which is heightened by the preoccupations of his training. He is inclined to take refuge from people in things. His primary interest is in materials, their structure, behaviour, response to processing. His experience is gained mainly in the monastic cell of the laboratory. His ego often dictates a sense of superiority over other men engaged in industry and commerce, among whom the administrative agent is often included. The research scientist is apt to regard any restrictions upon his complete freedom of action as due to the shortcomings of administrators who need skills of a high order if the frustrations of the scientist are not to be attributed to the administrative machine.

Research today is often carried out by teams rather than individuals. Development is often carried out in the same establishment. Men of various disciplines at various levels of experience and achievement are involved, in both craft and professional fields. Women are employed. The practice, or art, of management is related to the social sciences as is engineering to the physical or medicine to the biological sciences. Progress is at first empirical, but by virtue of it, the bases for judgement expand and the area within which decisions have to be taken on inadequate factual knowledge diminishes. Thus management, originally intuitive, gradually ceases to be the art of reaching right decisions on wrong information, or on none at all. By a similar process, but of technical advance, research has almost replaced invention as the stimulus to progress.

The difference between research management and industrial management is that research productivity (the assessment of which may be a largely subjective decision) does not lend itself to quantitative measurement as does industrial management, it has entirely different criteria. As an intellectual exercise, research management is much more complex. If experimental research is the reproductive process of science, by means of which it proliferates and expands, the research manager is accoucheur rather than accountant. In emphasizing this difference, however, I regard the difference between training for industrial and commercial managers on the one hand and research managers on the other as a difference of degree rather than of kind, because I believe the training of the former must approximate more and more to the training the latter needs.

The tactical elements of management really approximate to the technician level, the factual level, the 'how', but the important things relate to the 'why', the strategic aspects, policy making and handling of people, which are of course less amenable to exposition. Scientists who feel dissatisfied should try to decide whether their frustrations arise from policy (strategy) or from the irritations of day-to-day working, which can be put right by better tactics. Their approaches could be governed accordingly. I do not wish to overstress the esoteric elements of leadership and the aspects of personality contributing to them. Many feel that they cannot be taught; that they are in fact not amenable to exposition. In the extreme case, they say that if a man has the makings of a leader there is no need to teach him, whereas if he has not there is no point. To adopt such an extreme view would be to despair of the educative process. Thus a systematic effort should be made to train research managers, by example, by exchange of experience and by direct instruction.

Creative Freedom

The major difference between art and science in their creative aspects is that art is individual, science is collective. The scientist is helpless without his fellows, and part of his problem is that of reconciling his individuality with this corporate need. The conjunction between the man and the discovery so often appears to be fortuitous, both in space and time, a combination due to a particular man, a particular training and a stage in the state of the art, a spot of luck, and a chance turn of the kaleidoscope throws up the solution. Yet there is a sense in which the solution is inevitable, that if A doesn't reach it sooner or later B will. Even so, success may be more a matter of temperament than of training.

Creativity is only expected of a small proportion of the staff of a research organization. In a large establishment possibly a third or a fourth are in responsible charge of experimental research. A considerable proportion of these do not need a creative element. They need scientific training, mental dexterity, conscientiousness and self-discipline, but for a stated target the tools exist which permit the exercise to reach the goal with reasonable certainty. There are also levels of creativity and levels of its significance. A leap forward throws up demands for subsidiary information each of which may require a creative approach, but in another part of the spectrum.

Experience shows that some scientific staff reach the highest levels of scientific distinction without University training; others, with such training up to and including the doctorate level, are sometimes comparatively unsuccessful. University qualifications can not be used as a predictor of success in experimental research which involves the creative aspect. Lack of it, on the other hand, does not preclude such success.

I confess that I have not discovered any special technique for producing men who make significant discoveries, but the likelihood of success is at a

maximum with painstaking thought over selection, (with due regard to the limitations of interviewing and career statements) and careful training equally carefully chosen. Since much experimental research can be unrewarding I have found the offer of professional security of value. If a man or a small team began a task the outcome of which was uncertain, I undertook specifically to cover them against the criticism of any committee which might or person who might be disposed to condemn failure, an occupational hazard of research.

While many creative minds survive the academic process, formal university education in science appears too analytic and too critical for the imaginative and innovating type of mind. The basis of selection for an academic career depends largely on the academic achievement and on the intelligence quotient and the correlation between I.Q. or mental age and originality is apparently zero. The new discovery is most likely, however, to come from the man working under the conditions indicated above, but particularly, when he is freed from worry, protected from external pressures and guarded against criticism if the gamble fails to pay off.

I have suggested that a relatively small proportion of the staff of an industrial research organization need be creative, but some questions remain unresolved. Is problem solving a creative activity? Or does it result in the potentially creative mind deteriorating? The influences of age and sex on creative activity have been much discussed without clear conclusions. Is there a place in such an organization for the academically untutored inventor, who seems intuitively able to short-circuit a creative step and reach a phase of application by recognizing and empirically satisfying a need before science has fully defined the situation?

I do not wish to underrate education, except where it is mere exposure to instruction. The academic machine serves many, perhaps most, social purposes admirably. But education is no substitute for training, just as training alone is no substitute for education. Experience alone is no substitute for either, for working solely in the light of it is apt to become the perpetuation of past error.

Conclusion

Some final points may contribute to the desired atmosphere in an industrial research organization. A specific objective or target is more rewarding than a continuing general programme. If the programme includes both short-term and long-term assignments, the former should be defined by the management, the latter by the staff. A project or programme originating from within the department or organization is more likely to succeed than one from outside. With due regard to the field involved, a small organization seems more likely to succeed than a large one. The latter become susceptible to Parkinson's 'disease', departmentalization or excessive specialization, communication problems. Budgeting should be elastic, and the analysis in detail of costs actually incurred can be time-consuming and wasteful.

Programmes should be adjusted to staff, and not staff to programmes. In research, progress must be made where it can be made. It cannot be organized by a committee. Somebody must have an idea, unlimited enthusiasm and a sense of urgency. All a committee can do is to approve the goal and allocate resources. Research management must show that it wants ideas. It has to solve the contradictory situation of directing research while conceding freedom in the mode of initiating and conducting it.

1. Bull. Inst. Phys. 16 Nov. 1965 p.439 et seq.

OBITUARY

We are very sorry to report that Mr. H. Priestley died suddenly on 15th November at the age of 63. Harry Priestley joined the Station in 1958 and during his time here he cheerfully carried out his duties despite serious physical disability. He was well-known and liked by us all and our sympathy with his widow and family was expressed in the form of flowers and a gift

STAFF NEWS

Congratulations to:

Mr. and Mrs A. B. Lowe on the birth of their daughter Catherine Anne on 30th October.

Miss B. Kaiser and Mr. D. Petrie on their engagement.

Mrs K. M. Atkinson, now Supt./Typists

Mrs O.M. Sams now C.O.

Mrs P. M. Drakeford now T/C.O.

Welcome to:

Mrs M. M. Clarke T/C.O. (Sec.)

Mr. V. J. G. Brown T/A.E.O.

Mr. E. J. Cornwell Craftsman

Mr. G. E. Mackrell T/E.O.

Mr. H. L. Collin T/S.O.

Resignations

Mr. D. L. Brown T/A.E.O. (transferred to R.A.F. Medmenham)

Mr. N. C. Coe Lab. Mech.

Miss V. D. James C.O. (Sec.) (transferred to M.O.D. Medmenham)

Mrs M. Wetton Supt./Typist (transferred to Treasury)

SPORTS AND SOCIAL CLUB

BRIDGE CLUB

Two club evenings have been held in the last month: the first was a joint Pairs Tournament with the Road Research Laboratory in which Mr. and Mrs Nicolson were the winning E-W pair. We entertained N.P.L. on November 19th and after a narrow 2 I.M.P's margin at half-time, had finally to concede defeat by 57 I.M.P's. In the second match of the N.P.L. Interdivisional League on November 14th, R.S.R.S. were represented by Dr. and Mrs Bain and Dr. Dickinson and Mr. Zavody, who were placed second.

The next club evening will be on Monday 20th December and the first after Christmas will be held on Friday January 14th.

Jean Fooks.

CAMERA CLUB

The next slide show will be at 1255 on Tuesday, 4th January 1966, when Paul Dickinson will show pictures of "France; a few facets"

H. Rishbeth

LETTER TO THE OUTSTATIONS

Dear Colleagues.

You will have seen that some well-known members of the staff have left Ditton Park on transfer to posts in other departments. Vera James is now with Ministry of Defence at Medmenham. For years she has politely and efficiently coped with V.I.Ps., lesser visitors and troublesome creatures like newsletter editors who 'wonder if the Deputy Director could spare just two minutes.' We, editorially and in the general sense, are most grateful for her help.

Mrs Wetton has transferred to the Treasury taking with her our good wishes for her future career. She consistently managed to impose proper priorities on a turbulent mass of authors, all of whom 'wanted that final draft finished by this afternoon before going to a conference in Colorado'.

Among the radio meteorological group, Dennis Brown will certainly be missed. He has taken his realistic attitude to life, low noise amplifiers, and the profitable study of probabilities, to the R.A.F. Medmenham.

At the moment of writing, two modifications can be seen in and around the Station. Firstly, shades of the prison house begin to close around the growing staff. So might someone say on viewing a distant prospect of Ditton Park. On closer inspection, however, our new security fence can be seen to be designed to keep the public out, rather than to keep us in. Secondly, our Sports and Social committee have worked hard and well in making all ready for the Christmas dance. The Hall is decked with boughs of holly, and very well decked at that. 'A Merry Christmas' is writ large in snowy letters against the far wall - a happier message than Belshazzar saw - and one echoed by

Yours sincerely,

The Editor