Current Trends in Industrial Psychology

The great variety of research and activities commonly lumped together under the heading of industrial psychology and other more or less synonymous terms has often given rise to confusion in the public mind, to false expectations and to misdirected criticism. The aim of the following study is to delineate clearly and simply the scope of this expanding field and to make an orderly review of past progress, current preoccupations and probable future trends of research.

Introduction

Definition and Subject-Matter

The term " industrial psychology ", like many other terms in current use, is ambiguous and leads to misunderstanding because of its different meanings. In the sense that many individuals can claim to be practical psychologists on account of their wisdom and experience of people, industrial psychology has come to be equated with the philosophy of the human factor in industry. Often, too, it is felt to refer to the pseudo-science of industry, the doctrine of those who, with an air of scientific detachment, propound theories which have never been verified. Sometimes it is used to cover a small part of the subject-matter, such as personnel testing or morale surveys. Another common connotation of the term psychology is the psychiatric one, implying a concern or connection with the abnormal or pathological.

For the purpose of this paper " industrial psychology " will mean the scientific study of human behaviour and experience within the context of work. The industrial psychologist, therefore, will be characterised as studying the human factor in the work environment by means essentially of scientific methods, and professing no creed other than his faith in the methods of science.

The word " industrial " has to be interpreted as referring to industry in its widest meaning, in the same way that " labour ", in the sense of the International Labour Office, is not limited to physical toil but is extended to cover such varied activities as teaching, flying, nursing and coal-mining. " Industrial psychology ", " occupational psychology " and " personnel psychology " are in practice virtually equivalent terms.

The discipline underlying industrial psychology is that of psychology itself. As psychology is still far from being a unified integrated science, its theorists and practitioners start with many different concepts, use different methods, apply different criteria. Industrial psychology reflects this diversity, and its unification cannot take place before that of psychology itself.[1] Accordingly the field of industrial psychology is still evolving and is not precisely defined.

[1] R. A. Katzell : " Industrial Psychology ", in *Annual Review of Psychology*, Vol. 8, 1957 (Palo Alto, Cal.), pp. 237-268.

Considerable stress is placed then on the scientific nature of industrial psychology. It has been said that in all of the areas where industrial psychology has made real headway and has gained lasting acceptance by industry, the concept of measurement has been involved.[1] This is not to deny the importance of theory, for example the theory of management, the theory of work, etc., with which many relevant publications are concerned. Nor is it to deny that many psychologists work more as practitioners than as scientists, with the former in general applying the methods and knowledge developed by the latter.

In common with other sciences, industrial psychology has the long-term objective of seeking to establish facts and causal relationships. In general this objective is sought by determining the effect of different variable factors on three main criteria : individual efficiency; individual satisfaction ; and organisational effectiveness. Psychological research is therefore typically directed towards establishing the facts and causal relationships which will lead to the improvement of individual efficiency, the enhancement of satisfaction on the part of the individual, or the achievement of organisational effectiveness.

Clearly the three criteria are inter-related and overlap. Traditionally the criterion of individual efficiency has assumed greatest importance. More recently criteria such as measures of job satisfaction, of personal adjustment, self-fulfilment and group effectiveness have been increasingly used, reflecting no doubt a growing social awareness in society as a whole and the corresponding developments in social psychology and sociology.

It is implicit that all three criteria are regarded as important in their own right. Since investigations commonly seek to make measurements in terms of one criterion or another, a great deal of effort is devoted to the refinement of the criteria. This is essential spadework for developing tests and for studying causal relationships in general. It is one of the reasons, however, for which industrial psychology earns for itself the reputation of being unpractical or academic, for by its very nature such research, though essential for the development of the subject, may lead immediately to no concrete results.

The subject-matter of recently published work in the field of industrial psychology reflects a movement of emphasis towards social factors such as attitudes, leadership, motives and group influences. It has even been said, in an " obituary notice on industrial psychology ", that, with the current emphasis on the group in industry, industrial psychology has merged into sociology.[2] This view, however, is emphatically not borne out by any survey of current research ; many of the problems which began to be studied 25 years ago remain of great importance today. The main change which has taken place since then is that the problems tend no longer to be studied in isolation from the social influences upon them.[3]

It remains true that there may be little to distinguish the industrial psychologist from other social scientists working in industry. The problems which he investigates are often studied also within the framework of other disciplines. The boundaries between these different disciplines are not closely defined. Moreover, an increasing amount of

[1] Joseph TIFFIN : " How Psychologists Serve Industry ", in *Personnel Journal* (Baltimore), Vol. 36, No. 10, 1958, pp. 372-376.

[2] Morris S. VITELES : " Fundamentalism in Industrial Psychology ", in *Occupational Psychology* (London), Vol. 33, No. 2, 1959, pp. 98-110 ; and G. FRIEDMANN : *Industrial Society* (Glencoe, Ill., Free Press, 1955).

[3] H. A. LANDSBERGER : *Hawthorne Revisited* (Ithaca, N.Y., Cornell University, 1958).

work is carried out by teams of scientists, which may comprise psychologists, economists, sociologists, anthropologists, physiologists, anatomists, engineers, specialists in industrial design, in industrial relations, in the science of management, in administrative sciences, and others. The psychologist nowadays works and publishes in areas formerly considered the exclusive domain of such specialists. Throughout he brings to bear his particular orientation and training, coupled with his primary interest in the individual and his respect for him as a human being.

For the purpose of this report the subject-matter will be divided into main headings, as follows :

1. Improvement of Individual Efficiency
   (a) Selection
   (b) Training
   (c) Work Study and Human Engineering
2. Enhancement of Individual Satisfaction
   (a) Job Attitudes
   (b) Occupational Adjustment and Maladjustment
3. Achievement of Organisational Effectiveness
   (a) Nature of the Organisation
   (b) Management and Supervision
   (c) Relationships between Groups in the Organisation
   (d) Evaluation of Programmes.

These headings cover the principal areas in which research is currently being undertaken.

Growth of the Subject

There is no doubt that industrial psychology is both growing and thriving. The author of a recent review of relevant publications covering a 12-month period quoted 241 references, including 65 books.[1] In 1958 the American Psychological Association had 659 members giving industrial psychology as their major, or one of their major, professional interests. Although in other countries of the world the subject is in no case as developed as in the United States and the rate of development may not be so fast, more and more psychologists are addressing themselves to industrial problems.[2]

As in other branches of science, the differences of emphasis between one country and another in their approach to industrial psychology are

[1] L. W. FERGUSON : " Industrial Psychology ", in *Annual Review of Psychology*, op. cit., Vol. 9, 1958, pp. 243-266.

[2] A rough indication of this development may be inferred from the following list, drawn from a recently published register, which shows the number of psychologists expressing an interest in industrial psychology or some aspect of it (excluding vocational guidance where this appears to be primarily educational) and, in parentheses, the same number as a percentage of all psychologists from the country concerned listed in the register :

Germany (F. R.)	240 (23)	India	27 (12)
France	126 (27)	Union of South Africa	25 (20)
Canada	121 (22)	Brazil	21 (16)
United Kingdom	115 (16)	Finland	20 (21)
Australia	73 (26)	Switzerland	19 (11)
Netherlands	61 (24)	Sweden	18 (12)
Japan	50 (6)	Denmark	17 (8)
Norway	47 (28)	Yugoslavia	11 (17)
Austria	35 (28)	U.S.S.R.	10 (3)

The other 59 countries listed (excluding the United States) each had fewer than ten. See Eugène J. JACOBSON (Ed.) : *International Directory of Psychologists* (Assen, Netherlands, Royal Van Gorcum, 1958).

disappearing. This development is consistent with the evolution of psychology itself, which has advanced beyond the stage when a given school of psychology could be associated with any particular country.

The available summaries of current research in industrial psychology in different countries indicate remarkable similarities from one country and one area to another.[1] The differences that are found stem essentially from the varying types of problems which arise in different cultures and different occupations, as well as from the numbers of trained psychologists available to study them. Basically the scientific approach which psychology represents is becoming universal.

The illustrations given in the following sections of research in progress are drawn for the most part from English-speaking countries, in particular from the United States, where the subject has been pursued furthest. A good deal of current work in other countries consists in adapting and developing methods used in the United States. This is a necessary procedure ; no test, for example, should be used on a population different from that for which it was standardised until fresh evidence is obtained of its suitability in the new circumstances, for the cultural differences in the groups tested may radically change its validity. It is especially important that the findings of industrial psychology which relate to social phenomena, such as methods of supervision or attitudes to work, should not be uncritically transferred from one cultural setting to another. This obvious fact means that in countries where industrial psychology is a new subject much of the research effort is initially directed towards the replication of experiments already carried out elsewhere or towards the redevelopment of tests and methods to ensure their continued appropriateness.

Attitudes to Industrial Psychology

Although the attitudes expressed towards industrial psychology may in certain cases have been distrustful or sceptical, they are, without any doubt, becoming increasingly favourable as knowledge of the subject grows. Prejudice is founded on ignorance or on fear. In addition, critical attitudes derive from the mass of popular psychology, often worthless, from the overselling of psychological services—for example the large-scale promotion of presumably miraculous methods for the appraisal and development of supervisory personnel—and from false expectations, expressed for example by the executive who is quoted as saying that psychologists seem to be concerned with shooting mice while

[1] European Productivity Agency : *Register of Research in the Human Sciences Applied to Problems of Work* (Paris, no date) : (i) Belgium ; (ii) Denmark—Norway—Sweden ; (iii) France ; (iv) Germany (Federal Republic) ; (v) United Kingdom ; (volumes on Italy, the Netherlands and Switzerland to be published). Max PAGÈS (Ed.) : " Psychosociologie industrielle ", in *Hommes et techniques* (Paris), No. 169, 1959, pp. 1-214. R. BONNARDEL : " Progress in Industrial Psychology in France ", in *International Labour Review*, Vol. LXXIII, No. 6, June 1956, pp. 572-591. K. R. TIDMARSH : " A Note on Industrial Psychology ", in *Soviet Survey* (London), No. 33, 1960, pp. 112-116. R. CANESTRARI and others : " Current Developments in Applied Psychology in Italy ", in *Bulletin de l'Association internationale de psychologie appliquée* (Paris), Vol. 7, No. 1, 1958, pp. 2-77. Alberto MARZI : *La psicologia industriale in Italia. Studi Politici*, VI, II(3), pp. 244-263. Shigemi H. KIRIHARA : " Industrial Psychology in Japan ", in *Report of the Institute for Science of Labour* (Tokyo), No. 55, 1959, pp. 1-19. W. Leslie BARNETTE : " Survey of Research with Psychological Tests in India ", in *Psychological Bulletin* (Lancaster, Pa.), Vol. 52, No. 2, 1955, pp. 105-121. M. B. LOURENÇO FILHO : " The Present State of Psychology in Brazil ", in *Bulletin de l'Association internationale de psychologie appliquée*, Vol. 8, No. 2, 1959, pp. 2-15. " Management-Worker Relations : Current Research ", in *Personnel Practice Bulletin* (Melbourne), Vol. 14, No. 4, 1958, pp. 54-57.

his problems required the shooting of elephants. A trade unionist has pointed out that it is as illogical to object to the application of the science of industrial psychology as to complain that management makes regular use of the science of mathematics.[1]

A common criticism of industrial psychology is that it has been directed too much towards solving the problems and serving the interests of management. It has been suggested, in a British report [2], that this criticism is more valid in the United States than in the United Kingdom. If it has validity the reason for it may be found in the fact that it is very often a management which has sponsored a research project ; at the same time there are many ways in which industrial psychology could be of help to organised labour, which could, given the same resources, develop a labour-oriented psychology.[3] Ideally, however, the psychologist seeks to be independent and impartial and, when this end is achieved and the results of the research are made available equally to management and labour, antagonism to research is much reduced, if not eliminated. It is naturally of especial importance that this independence should be clear for all to see when management and labour hold divergent views on the problem being studied.

Another criticism, perhaps more insidious and difficult to refute, is that industrial psychology leads to psychological manipulation.[4] There is the fear that the results may give management power over the workers against which they have no means of self-defence. Whilst this attitude of mistrust may indeed have been deserved in respect of the work of certain practitioners who have invoked the name of psychology to justify or explain their manipulative techniques, it can have no validity in respect of the science itself of industrial psychology. Nor is there any evidence that the findings of industrial psychology can facilitate manipulation. On the contrary, experience suggests that trade unions are quick to recognise as disingenuous those who try to use techniques which are not supported by corresponding attitudes of sincerity.

Finally, it is not unknown for research carried out in industrial psychology to reveal unsatisfactory situations urgently requiring change, and for the research worker who has revealed all the difficulties to suggest no remedies or solutions. He frequently sees his task as limited to uncovering the facts, like a doctor who diagnoses but does not treat.[5] In the past this has often given rise to understandable frustration ; today the problem is recognised and the psychologist will normally make clear in advance the nature of the results that can be expected.

Improvement of Individual Efficiency

Selection

The problem of how to choose the right man for the job is a question which the first psychologists working in industry attempted to solve

[1] André Barjouet : " La C.G.T. et la psychotechnique ", in *Revue de psychologie appliquée* (Paris), Vol. 7, No. 2, 1957, pp. 71-80.

[2] Department of Scientific and Industrial Research and Medical Research Council: *Final Report of the Joint Committee on Human Relations in Industry (1954-57)* (London, H.M. Stationery Office, 1958).

[3] Tiffin, op. cit.

[4] J. Berthon : *The Unions and Psychosociological Techniques* (Paris, O.E.E.C. (E.P.A.) Union Study, No. 15, undated) ; and William Gomberg : " The Use of Psychology in Industry : a Trade Union Point of View ", in *Management Science*, Vol. 3, No. 4, 1957, pp. 348-370.

[5] Berthon, op. cit.

and which remains a vital field of inquiry, absorbing even today a substantial part of the effort devoted to the subject. It is certainly the area in which research has achieved the most impressive results, in terms at least of cash savings ; it has been estimated, for example, that psychological selection tests which cost the United States Navy some $25,000 to develop have saved at least $25 million a year by reducing the technical-school failure rate alone.[1] The savings made by industry may be less spectacular but are nevertheless highly significant, which is no doubt the reason why a substantial proportion—estimates vary as to the exact numbers—of companies in the United States, especially the larger ones, make use of psychological selection methods. In other countries these methods are also steadily winning increased acceptance, though they have generally met with greater reservation and scepticism. It has been concluded that psychological selection methods are " here to stay ".[2]

The psychological literature on personnel selection continues to be dominated by the time-honoured actuarial or statistical approach, which seeks to measure the mathematical relationship between a test or other method of predicting subsequent performance on the one hand and on the other a measure of the subsequent performance itself.[3] Over the years this approach has been refined, so that the trained psychologist need no longer make the mistakes of procedure and experimental design for which earlier he might have been forgiven and which even now can trap the untrained into deceptive errors of logic.

The use of mathematical statistics for investigating selection problems is naturally particularly appropriate when large numbers are involved. This is no doubt the main reason for the widespread use of these methods by the armed services of many countries, and why it is in general large industry rather than small which can put them to best effect.

Psychologists have worked on the one hand to develop effective methods of prediction, including tests of all kinds, interviews and other techniques, and on the other hand to evaluate the usefulness of these various methods. It seems permissible to make the following generalisations :

(1) The use of ready-made personality tests for selection purposes is becoming widely discredited.[4] Repeated studies have shown how easy it is to fake their results. The contribution of these tests to the effectiveness of selection is usually negligible.

(2) The most valid tests for the widest range of jobs are those measuring intelligence.[5] An intelligence test, however, is a blunt instrument. It requires refining in each specific situation in which it is used, and supplementing by measures of the particular aptitudes which are relevant.

(3) There is evidence that the General Aptitude Test Battery (developed by the United States Employment Service), which is designed to test simultaneously for suitability for various types of employment, achieves the result in practice and proves that this approach can be of considerable value for large-scale selection.[6]

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[1] A. S. LEVINE : " Reflections of a Personnel Research Psychologist ", in *Personnel Psychology* (Washington, D.C.), Vol. 11, No. 2, 1958, pp. 161-178.

[2] Stephen HABBE : " Developments in Psychological Testing ", in *Management Record* (New York), Vol. 21, No. 4, 1959, pp. 124-126.

[3] KATZELL, op. cit.

[4] TIFFIN, op. cit.

[5] LEVINE, op. cit.

[6] Beatrice J. DVORAK : " The General Aptitude Test Battery ", in *Personnel and Guidance Journal* (Easton, Pa.), Vol. 35, No. 3, 1956, pp. 145-152.

(4) Findings differ on the value of group selection methods, such as are used, for example, where a group of candidates are observed while resolving a given problem by means of discussion or while handling some other real-life situation. On the whole such techniques have been found useful, usually as part of the procedure of selection for positions of responsibility, according to results obtained not only in Europe, where the original experiments were made, but also in the United States, Australia and South Africa.[1]

(5) The interview, which is generally used for all types of selection, has been shown to vary widely in its predictive value and even in certain cases to be quite useless. A skilled interviewer can, however, make worth-while predictions in some circumstances.[2]

(6) Other devices, such as the use of biographical and personal data, ratings of performance and traits, measures of attitude and interest, handwriting analysis and so on, have been tried in many situations with varying, though usually very limited, success.

It can be predicted that work on selection will continue, for it satisfies a continuing need. Technical standards of test construction will improve ; statistical requirements will become better understood.

Apart from these everyday activities, it seems probable that increased effort will be devoted to the following three problems relating to selection :

First, there is the problem of how to select for executive positions, how to identify executive ability. Many consultants are now gainfully employed in assessing executives or candidates for executive responsibility. Such work is for the most part subjective and not based upon objective psychological method.[3] Relatively little of the work has been published. We may expect, therefore, further evidence of the value of different methods for this purpose.

Secondly, it has been suggested that there will be a development in the methods of selecting individuals with creative talent.[4] This is particularly important in many industrial activities, not only for example in design, but also for devising new tools and processes, new work methods, and so on.

Thirdly, there is likely to be further research into interviewing and interviewers. The question what distinguishes a good interviewer from a poor one remains unanswered. The answer is necessary for improved selection and training of interviewers. A related topic is the research being carried out in Canada on ways in which the decision is reached during the interview whether or not to employ the candidate.[5]

Training

The earliest psychological experiments in the nineteenth century were concerned with the problem of how the individual learns, since

[1] A. G. ARBOUS : *Selection for Industrial Leadership* (Cape Town, Oxford University Press, 1953) ; Kullervo RAINIO : *Leadership Qualities : a Theoretical Inquiry and an Experimental Study on Foremen* (Helsinki, Finnish Academy of Science, 1955) ; L. J. CRONBACH : " Assessment of Individual Differences ", in *Annual Review of Psychology*, op. cit., Vol. 7, 1956, pp. 173-196 ; and Bernard M. BASS : " The Leaderless Group Discussion ", in *Psychological Bulletin*, Vol. 51, No. 5, 1954, pp. 465-492.

[2] Philip E. VERNON : *Personality Tests and Assessments* (London, Methuen, 1953).

[3] W. E. KENDALL : " Industrial Psychology ", in *Annual Review of Psychology*, op. cit., Vol. 7, 1956, pp. 197-232.

[4] C. H. LAWSHE : " Blueprinting the Next Ten Years of Industrial Psychology : Needs and Developments in the Field of Personnel Requirements ", in *Personnel Psychology*, Vol. 12, No. 1, 1959, pp. 29-34.

[5] E. C. WEBSTER : " Decision Making in the Employment Interview ", in *Personnel Administration* (Washington, D.C.), Vol. 22, No. 3, 1959, pp. 15-22.

which time learning, together with its complementary process of training, has been the subject of a vast amount of study and research. Much of this work has been of a primarily theoretical nature, with the aim of explaining the learning process, whether in psychological, physiological or mathematical terms. With this aim, too, a very considerable number of experiments have been conducted on the learning of animals. At the same time a large amount of research has been centred on educational problems, beginning with those of the small child, and continuing with those of older children at school. From these fields, respectively of experimental psychology, comparative psychology, child psychology and educational psychology, there emerges a substantial body of knowledge concerning learning and training which can readily be applied in the industrial context.

In addition, industrial training itself has been extensively studied and the findings from other areas tested in industry. It is estimated that some 500 journal articles and books relating to training are published annually.[1] The resulting principles can for the most part be stated with assurance, and may be found in standard textbooks on industrial psychology [2], or on industrial training, written by psychologists.[3]

Current research on training is primarily concerned either with the detailed content or method of specific programmes, or with determining the over-all effectiveness of these programmes.

With regard to operator training, studies are currently being undertaken on the most efficient methods for the acquisition of skills [4] and on the use of training aids and devices, such as graphs, pictures, films, television, and complex simulators. Although there is plenty of scope for experiments of this nature to modify and refine existing knowledge, by and large the ground has already been well covered and it will be surprising if much further progress is to be made. On the other hand it is clear that in the application of this research there exists a real problem in the nature of a " development gap ". An inquiry conducted by the European Productivity Agency (E.P.A.) [5] has shown that, at least in Europe, a substantial part of operator training is still conducted on an essentially *ad hoc* basis and that the principles well established by psychologists for reducing training time and training cost are still widely overlooked and applied only in the more sophisticated organisations.

The training of supervisors has occupied the attention of psychologists more than any other type of training in recent years. The main reason for this is that the content of such training is often " psychological ", that is, designed to change the supervisor's attitudes or to alter his behaviour in handling his staff. Where the training does not relate primarily to such matters, for example training in work study or in

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[1] Ezra V. SAUL : " Note on Current Trends in Literature on Training ", in *Ergonomics* (London), Vol. 2, No. 2, 1959, pp. 180-182.

[2] For example J. TIFFIN and E. J. MCCORMICK : *Industrial Psychology* (Englewood Cliffs, N.J., Prentice-Hall, 1958).

[3] Douglas H. FRYER, Mortimer R. FEINBERG and Sheldon S. ZALKIND : *Developing People in Industry* (New York, Harper, 1956).

[4] For example Eunice BELBIN, R. M. BELBIN, and Frank HILL : " A Comparison between the Results of Three Different Methods of Operator Training ", in *Ergonomics*, Vol. 1, No. 1, 1957, pp. 39-50 ; and W. Douglas SEYMOUR : " New Methods of Training in Manual Skills ", in *New Developments in Training*, edited by Frank A. Heller (London, Polytechnic Management Association, 1959), pp. 23-32.

[5] European Productivity Agency : *The Training of Workers within the Factory*, E.P.A. Project No. 179 (Paris, 1957).

scheduled maintenance, psychologists have in general not been concerned with it. They have, however, aided in the development of the various methods for supervisory training: conferences, discussions, lectures, forced leadership, role-playing, case studies, group training, group dynamics, brain-storming and so on. Evidence has thus been accumulated on the relative value of these techniques according to the purpose they are intended to serve, which points to the view that as a whole the training has much to offer in helping supervisors to create a satisfying working environment and in making possible the fuller satisfaction of individual needs.[1] There remains, however, considerable doubt arising from a number of studies whether supervisors trained in "human relations" do supervise differently from the untrained and whether some of the training does in fact achieve its objectives.[2] One such finding which has particularly attracted attention is that the effects of supervisory training may become neutralised when the trainees' superiors possess attitudes contrary to those developed through the programme.[3] It can confidently be predicted, therefore, that the training will be the subject of extensive further discussion and investigation.

These comments relating to the training of supervisors apply equally to the training of managers, except that the relatively fewer numbers of managers trained (or "developed", to use the current euphemism) and the difficulty in finding objective measures of the effectiveness of training have led to a notable lack of evaluative research, in spite of the manifest need for it. Further inquiry can therefore also be predicted in this area.

The training of groups other than operators, supervisors and managers is beginning to engage attention, for example the training of technicians and scientific research workers. The same is true of training in specific subjects, such as different forms of communication: public speaking, report writing, speeded reading. In all these fields the role of the psychologist has been to develop and evaluate existing and new methods.

One consequence of all this work is that training research is increasingly being integrated into training programmes. The old assumption that training is desirable because the textbooks say so or because it is general practice is questioned. Techniques have been evolved for building into the training programme a research design that will enable the results of the programme to be evaluated; indeed those sponsoring or administering such programmes have been urged to accept research as an integral part of the programme as much as, for example, visual aids or practical demonstrations.[4]

By way of illustration it is sometimes possible, if an appreciable number of students are to be trained, to assign them to strictly equivalent matched groups before the training begins and to administer a test, which is related to the objectives of the course, to some of the groups before training and to others after it. This would permit an experimental evaluation in which the margin of error can be calculated, as distinct from an impressionistic one such as would be obtained by giving all the

[1] VITELES, op. cit.

[2] John D. HANDYSIDE: "The Effectiveness of Supervisory Training—A Survey of Recent Experimental Studies", in *Personnel Management* (London), Vol. 38, No. 336, 1956, pp. 97-107; and Michael G. BLANSFIELD: "Research in Personnel Testing", in *Public Personnel Review* (Chicago), Vol. 20, No. 1, 1959, pp. 67-71.

[3] E. A. FLEISHMAN: "Leadership Climate, Human Relations Training and Supervisory Behavior", in *Personnel Psychology*, Vol. 6, 1953, pp. 205-222.

[4] BLANSFIELD, op. cit.; Cecil E. GOODE: "Assessing the Value of Training", in *Public Personnel Review*, Vol. 20, No. 1, 1959, pp. 66-67.

students a test at the end of the course, the traditional procedure which gives a measure of attainment at the time but which does not enable any precise assessment to be made of the amount of change resulting from the course. The experimental approach is particularly useful and necessary when the subject-matter being taught is more a question of attitudes than of fact—as in most supervisory training for example—and where the students can be expected to have their own views even at the beginning of the training. It is clear, however, that the research design, of which the above illustration is only one possible variant, has to be based upon the specific needs of the situation ; thus, if one were trying to assess the progress made by a group of students beginning to learn a foreign language, a complicated design becomes quite unnecessary, since any simple test is a measure of progress.

Another interesting development is the case-study carried out in London of the working of the department of management of a technical college.[1] Using the method of collaborative action research developed by the Tavistock Institute, the teaching provided by the department was studied in the light of both the needs of its teachers and the needs of its students and of the firms which employed them. In this way the usefulness of the training could be assessed and ways of improving it suggested.

Finally it has to be noted that there is a trend—which may or may not be a recent trend, but is certainly a current one—to use " psychology " itself as part of the content of industrial training.[2] Thus the E.P.A. has recently held a meeting to discuss psychology as part of the content of management as a field of learning.[3] Similarly I.L.O. technical assistance experts have provided for instruction on psychology as part of courses in supervisory techniques.[4]

One may conclude that research into training fills a continuing need and is thus likely to remain a central part of industrial psychology. It seems most probable that the main emphasis will be placed on evaluation research, assessing the effects of different methods and different courses, with the trainers and the psychologists collaborating for this purpose at the time the training is planned. The type of training for which such research is most required is that of executive development.

Work Study and Human Engineering

The terms " work study " and " human engineering " cover between them a wide field of activities, which may include all or part of the following : job analysis (including job description and job specification) ; work measurement (time study) and wage incentives ; appraisal of performance (merit-rating) ; work methods ; study of the physical environment of work ; safety. Whilst these are all subjects for which the primary responsibility customarily falls under another discipline—for example industrial engineering, safety engineering, product or process designing, and personnel management—psychologists have carried out research in all these areas—research which is generally limited to the psychological aspects of these technical operations.

[1] C. Sofer and G. Hutton : *New Ways in Management Training* (London, Tavistock Publications, 1958).

[2] European Productivity Agency : *Selection and Training of Foremen in Europe*, E.P.A. Project No. 234 (Paris, 1956).

[3] Sixth International Conference on Management Education and Training, held in Lisbon, 1959.

[4] See for example I.L.O. : *Report to the Government of Israel on the Training of Foremen and Instructors* (I.L.O./T.A.P./Israel/R.9, 1959) (mimeographed).

The quantity of relevant research is substantial. A recent bibliography on human engineering alone quoted 5,666 titles.[1]

The various topics will be discussed in turn.

Job Analysis.

Job analysis is a basic task of personnel management, serving several different purposes. It is a prerequisite for efficient selection, training, job evaluation and work simplification, as well as for vocational guidance. The earliest textbooks on industrial psychology were thus concerned with job analysis. Unfortunately it does not seem as though much real advance has been made since, although in recent years improved procedures for occupational classification have been realised [2] and several new techniques of job analysis have been developed which may prove to be useful.

One such technique is the " critical incident " method, which consists of a set of procedures for the systematic collection of observations concerning activities deemed to be crucial or critical in the performance of a task. Thus studies have shown what are the critical requirements of such varied skills as flying an aeroplane, dentistry, industrial supervision, etc.[3]

Another technique uses the concept of the " time-span of discretion ", that is the period of time within which decisions taken by any individual at his discretion may commit the resources of the organisation.[4]

Yet another technique which shows promise but which requires further research and refinement is a method of job description for executive positions. According to this, each manager is asked to determine the relevance to his own job of a large number of " position elements " ; his replies permit the classification of his job in terms of ten statistically determined dimensions which the author considers to be the " basic dimensions of executive positions ".[5] An approach such as this might be particularly valuable if developed and used within one large organisation.

The psychological characteristics of jobs provide the job analyst with his major technical problem. Admirably complete definitions now exist of the duties performed and the skills and tools used on a wide range of jobs. For many purposes, however, such definitions are not adequate and need to be supplemented by descriptions in psychological terms, for example the personality satisfactions to be expected from the job, the type of working relationships involved, or the difficulties and distastes inherent in it.[6] Variables such as these also need to be taken into account for identifying job " families " or " clusters ". It has been

[1] I. N. McCollom and A. Chapanis : *A Human Engineering Bibliography* (San Diego, San Diego State College Foundation, 1956).

[2] Sidney A. Fine and Carl A. Heinz : " The Functional Occupational Classification Structure ", in *Personnel and Guidance Journal*, Vol. 37, No. 3, 1958, pp. 180-192.

[3] John C. Flanagan : " The Critical Incident Technique ", in *Psychological Bulletin*, Vol. 51, No. 4, 1954, pp. 327-358.

[4] Elliott Jaques : *Measurement of Responsibility* (London, Tavistock Publications, 1956).

[5] John K. Hemphill : " Job Descriptions for Executives ", in *Harvard Business Review* (Boston), Vol. 37, No. 5, 1959, pp. 55-67.

[6] Alec Rodger : " How Should We Think about ' Interests ' in Occupational Psychology ? ", in *Bulletin de l'Association internationale de psychologie appliquée*, Vol. 8, No. 1, 1959, pp. 2-9 ; and Mason Haire : *Psychology in Management* (New York, McGraw-Hill, 1956).

predicted that more work will be done in the next few years on these problems [1], although the inherent difficulty of the task leaves doubt as to its ultimate success.

Work Measurement and Wage Incentives.

" The entry of the psychologist into those areas of the employment relationship covering the use of industrial engineering has been enthusiastically welcomed by the trade unions " [2], because he succeeded in demonstrating a wide gap between the rigid mathematical theory of the engineer and the actual behaviour of the workforce. In general the role of the psychologist has been critical and not constructive. For example studies have been made showing the unreliability of rating and of the rest and fatigue allowances used in time study, and revealing how the operator is constrained to adopt protective practices when, regardless of the effort he exerts, factors beyond his control interfere with his earnings.

Also important have been the analyses of social factors affecting the operation of incentive schemes. These factors are now widely recognised as playing an important role, leading to restriction of output, with the consequent inefficiency of the scheme itself.

A recent review of the different types of incentive payment systems, outlining their successes and failures, advantages and disadvantages, has suggested many further areas of psychological research in this field.[3] In view of the widespread use of work measurement the need for such research is apparent, though few psychologists appear to be engaged upon it at the present time.

Appraisal of Performance.

The appraisal of performance by merit-rating has, on the other hand, been the subject of many detailed psychological studies. This is to be expected, for the process involves essentially a systematic evaluation of one individual by another and thus introduces the " human factor " very directly.

The main body of this research is devoted to the construction and development of the rating forms, of which there exist a large number of varieties. Many have been introduced on an *ad hoc* or amateurish basis ; many have been borrowed from other sources and translated into situations where they are no longer suitable ; many contain defects which result from ignorance of some of the principles that have been more or less well established by research. In consequence the role of the psychologist is often to rectify the existing situation or to carry out the extensive development work which is necessary for arriving at a new form appropriate for use in any specific context.[4]

Merit-rating is normally introduced to serve two purposes. First, it is intended to enable the individual who is being rated to improve his performance. To this end the written assessment is often supplemented

[1] LAWSHE, op. cit.

[2] GOMBERG, op. cit.

[3] R. MARRIOTT : *Incentive Payment Systems : a Review of Research and Opinion* (London, Staples, 1957).

[4] Robert J. WHERRY : *Employee Relations Research in Standard Oil Company (New Jersey) and Affiliates* (New York, 1955).

by an " appraisal interview ". The value of these procedures has often been questioned ; it seems legitimate to doubt, for example, whether personality traits, which are frequently included as subheadings in merit-rating, can be much changed by such devices.[1] Relatively little research has been done on this issue directly, but there have recently been a number of important studies on the effects resulting from different methods of conducting appraisal interviews.[2]

Secondly, merit-rating is designed to provide the organisation with a measure of the individual's job success, as a basis on which to pay him more, promote him or train him. The rating is thus used by psychologists as the criterion against which to determine the success of selection or training procedures.

It can safely be stated that merit-rating provides a continuing subject for applied research in addition to raising more general theoretical problems which require investigation.

Work Methods.

Until recent years the study of methods of work, comprising mainly motion study and work simplification, were almost exclusively the concern of the industrial engineer, although both perceptual tasks and bodily movements form a basic part of general psychology and could therefore be considered a legitimate field for psychological investigation in their industrial context. Since the end of the Second World War there has been a remarkable growth of interest shown by psychologists in the broader problems of working methods, stimulated at first to a large extent by the demands of the military and latterly by the increasing complexity of modern industrial technology.

This is especially a field where much of the work is interdisciplinary, where psychologists co-operate with physiologists, engineers and other scientists. It is also characterised by a terminology which is still far from being firmly established. Thus the following terms are all in more or less current use to denote the scientific study of problems associated with the task or its performance, or some detailed aspect of such study [3] : engineering psychology, human engineering, ergonomics, human factors research, biomechanics, biotechnology, psychotechnology, applied experimental psychology, systems analysis, engineering physiology, engineering anthropology, aviation psychology, and applied biophysics. In view of its growing acceptance by industry and government, it has been predicted that human engineering will soon emerge as a recognised and unified interdisciplinary study.[4] There are many indications that this is happening, although the inherent diversities of background and divergencies of outlook may make it a slow process.

The actual topics investigated vary from the very specific to the more general and theoretical. They relate essentially to the part played by the human operator in any system of controls or equipment. The attempt is made on the one hand to provide quantitative data on the

[1] Philip R. KELLY : " Reappraisal of Appraisals ", in *Harvard Business Review*, Vol. 36, No. 3, 1958, pp. 59-68.

[2] Norman R. F. MAIER : *The Appraisal Interview* (New York, Wiley, 1958).

[3] Frank GELDARD : " Engineering Psychology : a British Psychological Society Symposium ", in *Occupational Psychology*, Vol. 31, No. 4, 1957, pp. 209-212.

[4] J. W. DUNLAP : " Blueprinting the Next Ten Years of Industrial Psychology : Needs and Developments in Equipment Design ", in *Personnel Psychology*, Vol. 12, No. 1, 1959, pp. 34-36.

characteristics of human performance in respect of the variable factors imposed by the task ; and on the other hand to provide those responsible for designing the machine or the system with the appropriate measures of normal human capabilities which will enable them to assess the probable limitations inherent in human performance.[1]

The first main group of problems with which these investigations are concerned relate to the processes by which an operator receives information. For example the way in which a battery of dials is arranged has been extensively studied, and general principles for constructing and arranging dials so that they can be read with the minimum of error can now be stated with confidence. The same may be said of the ease of interpreting different types of scales and instruments, of typographic styles, of warning signals, and other forms of information needed by the operator for performing the task.

Secondly, having received the information, the operator has to act upon it, whether it be to operate the machine, fly the aeroplane, or perform some similarly complex task. The quality and nature of such skilled performance represents a big area of research. It may be influenced not only by the way in which information about the task is received but also by fatigue, by aging, by training, and by differences in ability between one individual and another ; by psychological factors such as the motivation of the operator and the social pressures upon him ; by physiological or anatomical factors such as physical strength and length of limb ; by the effect of alcohol and other drugs ; by the design of the controls the operator is required to operate, such as the handles, the levers and the pedals, and by their arrangement relative to him and to each other. The research embraces all these variables, and others besides.

Some types of problem have been studied more intensively than others ; not much remains to be learnt about dial-reading for example, whereas the operation of semi-automatic machinery has been relatively little investigated.[2] Such gaps will doubtless be filled as the need is felt, and new problems studied such as those occasioned by automation, ultrasonic speeds and space travel.[3]

The consequences of all this work may well be considerable. Apart from the direct improvements in performance which can be expected from better working methods, it may often follow from analysis of the functions carried out respectively by men and machines as part of an operation or system that long-term changes in the nature of work itself may result, or that important alterations may be made in the design of consumer products such as automobiles, household equipment, etc.[4] From a theoretical point of view there is no doubt that much remains to be done, if only in repeating in varied settings many of the preliminary experiments that have been made in order to establish the generality of the findings.[5] Even on the basis of existing knowledge and techniques, however, the possibilities of application remain substantial.

[1] Paul M. FITTS : " Engineering Psychology ", in *Annual Review of Psychology*, op. cit., Vol. 9, 1958, pp. 267-294.

[2] KATZELL, op. cit.

[3] DUNLAP, op. cit.

[4] Ernest J. MCCORMICK : " Human Engineering : an Old Idea with New Applications ", in *Personnel Administration*, Vol. 22, No. 2, 1959, pp. 6-17 ; and R. A. KATZELL : " Blueprinting the Next Ten Years of Industrial Psychology : Some Additional Prospects ", in *Personnel Psychology*, Vol. 12, No. 1, 1959, pp. 45-48.

[5] Bernard UNGERSON : " Engineering Psychology : a British Psychological Society Symposium ", in *Occupational Psychology*, Vol. 31, No. 4, 1957, pp. 213-217.

Study of the Physical Environment of Work.

Related to the study of work methods is that of the physical environment in which the work takes place. The effects of variables such as lighting, heating, noise, hours of work, rest-pauses, background music, design of seats, etc., have been studied over the years and little basic research remains to be done. Current research is primarily concerned with specific problems arising from present-day needs. A comparison might be made, for example, of performance on a certain task in an air-conditioned room and in one that is not ; the effects on performance might be measured for tropical or sub-arctic conditions ; the illumination might be varied to give optimum performance on a visual inspection job ; the amount of interference with performance of a task might be assessed for different levels or types of background noise ; and so on.

A recent example of current work in this field is the study by researchers in England [1], who tested out in industry certain theories regarding the effects of noise which had previously been confirmed only in laboratory experiments. Generally speaking such experiments had shown that continuous noise of high intensity led to a decrease in working efficiency, not by decreasing the rate of output but rather by increasing the frequency of momentary lapses and errors. By obtaining analogous results in a real-life work situation the authors enhance the value of the laboratory findings, since it becomes more legitimate to generalise from them.

Safety.

The standard textbooks on industrial psychology normally include a chapter on accidents and safety, asserting that the great majority of accidents can be attributed to psychological or personal causes. At the same time the contribution of psychology to the understanding of accident causation and to accident prevention has been relatively disappointing. The small amount of emphasis given in the safety literature to psychological research is reflected by the subdivision of the 42 topics abstracted in the I.L.O. journal *Occupational Safety and Health*, of which one is entitled " Occupational physiology and psychology " and another " Medical and psychological aspects of occupational accidents ", whilst the remaining 40 items almost all relate to the " technical ", non-psychological aspects of the subject.[2]

Psychological research on accidents has been hampered by statistical and methodological problems.[3] There has been, for example, the long argument about " accident-proneness ", a term coined to describe the phenomenon that some individuals are disposed to have more accidents than others. But successive investigations have raised the doubt whether the concept is anything more than a statistical artefact, without any real psychological meaning.[4] Whilst it can be shown that age, health, defective vision, fatigue, the consumption of alcohol, and differential exposure to risk are all related to accident causation, the analysis of

[1] D. E. BROADBENT and E. A. J. LITTLE : " Effects of Noise Reduction in a Work Situation ", in *Occupational Psychology*, Vol. 34, No. 2, 1960, pp. 133-140.

[2] *Occupational Safety and Health* (Geneva, I.L.O.), Vol. VIII, No. 1, 1958, p. 5. Editorial note.

[3] KENDALL, op. cit.

[4] A. G. ARBOUS and J. E. KERRICH : " Accident Statistics and the Concept of Accident-proneness ", in *Biometrics* (Washington, D.C.), Dec. 1951, pp. 340-432.

emotional and other mental causes remains exceedingly difficult. Tests, by and large, have failed to identify the safe employee from the unsafe.

Much of the work undertaken by psychologists on safety is carried out within the framework of the study of equipment design, and safety is the aim of much human engineering research. The design of aircraft cockpits or crane cabs, for example, can be modified for safer operation. Other current investigations carried out by psychologists include the effects of alcohol on driving ability and the effects on accident prevention of safety propaganda and of the interest shown by management. Although the amount of published work is relatively small, safety clearly represents a continuing and worth-while subject of research.

Enhancement of Individual Satisfaction

Job Attitudes

The satisfaction of the individual at work is now commonly regarded as an important objective in its own right. Job satisfaction is therefore used as a criterion against which to measure the effectiveness of different personnel procedures, methods of supervision and organisation, and so on. The enhancement of satisfaction has also become one of the major aims of the practitioners of industrial psychology who, mainly by means of the " attitude (or morale) survey ", attempt to identify and eliminate the acknowledged sources of dissatisfaction.

The study of the attitudes, morale and motivation of employees is one of the most active topics in current industrial psychology. Several recent textbooks have been largely devoted to it.[1] In 1957 a review was made of some 2,000 books and articles on job attitudes alone.[2]

Attitudes are normally measured by means of standardised scales, given by questionnaire or interview. The best known application is that of the public-opinion poll. In order to give reliable results such scales have to be extensively tested before use and thus refined into relatively precise measures operating within known limits of accuracy. The development of new and improved scales may itself, therefore, consume considerable research time and energy.

Having obtained a suitable measuring instrument of job satisfaction, the most common application is simply to administer it to the different departments of an organisation. Analysis of the results yields interesting information about the relative satisfaction of the different departments and the causes of dissatisfaction. Indeed some managements have found this procedure to be so valuable that they have introduced it as a permanent part of their personnel practice, thus ensuring that they are informed at regular intervals of the level of satisfaction of all their employees and enabled to plan their personnel policies with the maximum effect.

One remarkable finding which recurs in surveys of this kind is the prevalence of job dissatisfaction. It has been estimated that at least 13 per cent. of the working population in the United States express a generalised negative attitude towards their jobs.[3]

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[1] See for example Morris S. Viteles: *Motivation and Morale in Industry* (London, Staples, 1954); and Ross Stagner: *Psychology of Industrial Conflict* (New York, Wiley, 1956); and Haire, op. cit.

[2] Cecil E. Goode (Ed.): " Research on Worker Attitudes ", in *Public Personnel Review*, Vol. 20, No. 3, 1959, pp. 226-229.

[4] Goode, op. cit.

In addition to the measurement of job satisfaction, the range and variety of attitudes which are studied in this way are impressive, as may be judged from the following examples concerning specific groups : the attitude of managers and workers towards the company, towards the union or unions, and towards wage incentives ; the attitude of managers towards emp oying o'der workers, and that of older workers towards retirement ; the attitude of workers towards their supervisors, towards safety ru.es and campaigns, and towards emp'oyment in the civil service ; the attitude of women workers towards promotion, that of the wives of workers towards shift-work undertaken by their husbands, and that of school-leavers towards different occupations.

Once an attitude has been measured the next type of analysis which is frequently made is to determine the relationship between those expressing a given attitude and the characteristics of the individuals concerned and of their jobs and working conditions. Thus in different contexts job satisfaction has been found to be related, for example, to the age of the worker, his education, the type of work he performs, whether or not it is machine-paced, whether or not it is shift-work, the method of payment and the amount of pay, and the size of the organisation. Moreover the components of satisfaction can be identified: thus satisfaction with the type of work may be associated with dissatisfaction with wages.

It is also possible to determine the extent to which job satisfaction can be equated with efficiency. Is a contented workforce an efficient workforce, and vice versa ? Is it true that there is a conflict between the economic and the humanitarian approach, so that to meet the needs of the one may be to deny those of the other ? Research indicates the relationship to be neither simple nor direct ; but a relationship clearly exists since both are influenced by common factors in the work situation. It is clear, however, that high productivity is not necessarily associated with the maximum satisfaction of individual needs.[1]

At the same time there is a certain amount of evidence that there may be a more direct relationship between job attitudes and forms of withdrawal from the work situation, especially unauthorised absence and labour turnover.[2]

In all these analyses it will be seen that the measure of attitude has been related to some simple objective variable. In an increasing number of researches, however, the attitude is examined in relation to other " psychological " variables in the situation. For example, and perhaps most important of all, research has been directed towards assessing the effect of the behaviour of the supervisor and of the type of supervision he exercises. It is well established that the attitudes of employees are considerably affected by supervisory practices. The precise inter-relationships, however, between these attitudes, the performance of the employees, the type of work on which they are engaged, and the method of supervising (analysed as it may be in many different ways) remain a challenging subject of inquiry.

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[1] Robert L. KAHN : " Human Relations on the Shop Floor ", in E. M. HUGH-JONES (Ed.) : *Human Relations and Modern Management* (Amsterdam, North-Holland Publishing Co., 1958), pp. 43-74.

[2] Arthur H. BRAYFIELD and Walter H. CROCKETT : " Employee Attitudes and Employee Performance ", in *Psychological Bulletin*, Vol. 52, No. 5, 1955, pp. 396-424 ; and Hilde BEHREND : " Voluntary Absence from Work ", in *International Labour Review*, Vol. LXXIX, No. 2, 1959, pp. 109-140.

Finally, a new and significant development has been the attempt to throw further light on these questions by carrying out actual experiments in the field. Thus in one situation a deliberate change was introduced in the method of supervision, under conditions permitting the measurement of its effect upon productivity and attitudes.[1] There is a clear need for further experimentation of this kind.[2]

Occupational Adjustment and Maladjustment

There is a widely held belief, in support of which there exists a certain amount of evidence, that the maladjusted employee, the employee with an emotional disturbance, is more likely, because of this condition, to incur accidents, to be late at work, to be absent, alcoholic or sick, to produce sloppy work, to have poor relationships with his colleagues, and generally to have lower productivity and morale. There is evidence, too, that stresses occurring at work often give rise directly to psychosomatic illness. Even if this catalogue of ills does not universally result from maladjustment and even if in some cases the symptom is inseparable from the cause, there nevertheless remains a problem of such magnitude that its cost to United States industry alone has been estimated at hundreds of millions of dollars annually.[3] Nor is the problem likely to diminish in so far as psychosomatic illness is concerned, for it has been predicted that the incidence of these disorders will increase.[4]

The post-war years have seen a growing recognition of the problem by industry and at the same time a rapid growth in the numbers of counsellors and clinical psychologists, whose training enables them to apply the experience gained in psychological clinics and mental hospitals. The therapeutic work undertaken by these specialists may be at a relatively deep level, verging on the psychiatric, seeking to handle basic questions of mental health, personality and emotional adjustment. Other counsellors are more concerned with the more cognitive problems of vocational choice, or with the day-to-day difficulties resulting from the work environment.

The concern of all counsellors is essentially with the individual, to help him in understanding his own motivation and psychological needs, in developing his own identity as a person, and as far as possible in resolving his own difficulties.[5] The extent to which this concept of counselling is expanding, in contemporary thinking, the earlier idea of vocational guidance as simply the means of recommending the most suitable career for a school-leaver is illustrated by the recent definition of vocational guidance as a " process of helping a person to develop and accept an integrated and adequate picture of himself and of his role in

[1] Nancy C. MORSE and Everett REIMER : " The Experimental Change of a Major Organisational Variable ", in *Journal of Abnormal and Social Psychology* (Boston), Vol. 52, No. 1, 1956, pp. 120-129.

[2] Robert L. KAHN : " Blueprinting the Next Ten Years of Industrial Psychology : Morale, Motivation and Related Areas ", in *Personnel Psychology*, Vol. 12, No. 1, 1959, pp. 37-40.

[3] A. A. MCLEAN and G. C. TAYLOR : *Mental Health in Industry* (New York, McGraw-Hill, 1958).

[4] Society for Psychosomatic Research : *The Nature of Stress Disorder* (London, Hutchinson Medical Publications, 1959).

[5] Harry LEVINSON : " The Psychologist in Industry ", in *Harvard Business Review*, Vol. 37, No. 5, 1957, pp. 93-99 ; and L. E. TYLER : " Counseling ", *Annual Review of Psychology*, op. cit., Vol. 9, 1958, pp. 375-390.

the world of work, to test this concept against reality, and to convert it into a reality, with satisfaction to himself and benefit to society ".[1] The old analogy of fitting square pegs into round holes is becoming outmoded ; the pegs are not made of wood, cut in a particular shape, but rather of plastic, and only in the process of moulding can the final shape and the most appropriate hole be ascertained.[2]

Most of the work undertaken as counselling is non-scientific, in the strict sense of the term. The value of scientific method in this context is widely recognised, however, and there is a tendency towards the increasing use of controlled observations and experiments. In the field of counselling, for example, it has proved possible to test hypotheses concerning detailed aspects of the relationship between the counsellor and the counsellee, as well as to carry out investigations to evaluate the over-all change in behaviour resulting from the counselling. In the field of vocational guidance significant research has been carried out in recent years concerning the stages in development through which an individual may pass before arriving at the choice of a career. The bulk of the research effort in all these related subjects, however, continues to be devoted to the construction and standardisation of suitable psychological tests for use in counselling.

One further study deserves mention. The recent publication [3] of analyses of the reasons why some 2 million American men were either rejected or prematuraly separated from service during the Second World War on account of mental or emotional instability or ineffectiveness provides a wealth of factual information which is in many ways significantly relevant to peacetime employment.

Achievement of Organisational Effectiveness

Nature of the Organisation

A relatively new but fast-growing area of psychological research is that of the nature of the organisation. With a view ultimately to evolving basic general theories of organisation, such research has the broad aim of determining the human implications of organisational policies and practices and of different types of organisation on the one hand, and the human requirements for an effective organisation on the other.

Although many of the factors which control the effectiveness of an organisation lie outside the competence of the psychologist, there remain nevertheless certain psychological elements which can be studied. Terms in current use such as the " psychological climate of the organisation " or the " personality of the company " represent an invitation to psychologists to develop techniques for their measurement.[4] Furthermore, in so far as an organisation seeks to satisfy the individual needs of its members, its effectiveness can be assessed in terms of the extent to which it achieves this purpose. It is expected that more research in the future will focus on the psychological requirements of an effective or healthy organisation, taking as a starting-point the hypothesis that the

[1] Donald E. Super : *The Psychology of Careers* (New York, Harper, 1957).

[2] M. B. Stott : " An Autobiographical Study ", in *Occupational Psychology*, Vol. 33, No. 2, 1959, pp. 69-79.

[3] Eli Ginzberg and others : *The Ineffective Soldier : Lessons for Management and the Nation* (New York, Columbia University Press, 1959), 3 vols.

[4] B. von Haller Gilmer : " Industrial Psychology ", in *Annual Review of Psychology*, op. cit., No. 11, 1960, pp. 323-350.

organisation and the individual are not only inter-related but exert specific influences upon each other [1], and that the machine-like rationality of organisational functioning has to be reconciled with the human needs of the individuals it comprises.[2]

The new branch of personnel management which is often referred to as organisation planning represents a further area of research for the psychologist.[3] The effects have been studied, for instance, of working in large organisations or small ; in large work groups or small ; in centralised or decentralised organisations ; or of changing from one to the other. Several research projects relate to the question of job enlargement ; the theory is being investigated that the grouping of activities, through which the time cycle of the unit of work is extended, may, by imbuing the task with a greater sense of significance, afford increased satisfaction without any impairment of efficiency. The human problems associated with the introduction of automatic and semi-automatic processes have also been extensively discussed in recent years.[4]

Another related topic which is increasingly the subject of research is that of communication.[5] The efficiency of an organisation may well depend upon the successful transmission and reception of communications at the appropriate time. Studies have therefore been made of the relative difficulty of reading and understanding different written materials, of the flow of information through an organisation, and of the effectiveness of visual aids and other means of communication, for example.

Although all these topics have importance for the effectiveness of the organisation, it is generally agreed that one of the principal determinants of the success of an organisation lies in the quality of its management. For this reason the major area of research in relation to organisation concerns the nature of management and supervision. This topic is discussed in the following section.

Management and Supervision

How most effectively to manage or supervise is a basic question which has stimulated considerable research in post-war years.

A great many theories of leadership have been developed. Thus a recent survey quotes ten quite different definitions of leadership.[6] Another survey reduces this to three main types of definition.[7] Much of the literature still relates to the classification of leadership as either autocratic, democratic or laissez-faire, which was first used in 1939 for the study of groups of eleven-year-old boys [8] and has provided a number

[1] Chris ARGYRIS : " Human Relations : a Look into the Future ", in *Management Record*, Vol. 21, No. 3, 1959, pp. 82-84.

[2] KAHN, op. cit., 1958.

[3] KENDALL, op. cit.

[4] J. R. GASS : " Research into the Social Effects of Automation ", in *International Social Science Bulletin* (Paris), Vol. 10, No. 1, 1958, pp. 70-83.

[5] R. SEXTON and Virginia STAUDT : " Business Communication : a Survey of the Literature ", in *Journal of Social Psychology* (Worcester, Mass.), No. 50, 1959, pp. 101-118.

[6] U.S. Civil Service Commission : *Leadership and Supervision*, Personnel Management Series No. 9 (1955).

[7] Chris ARGYRIS : *The Present State of Research in Human Relations in Industry*. Report for the European Productivity Agency (Paris, 1954).

[8] Kurt LEWIN, Ronald LIPPITT and Ralph K. WHITE : " Patterns of Aggressive Behavior in Experimentally Created ' Social Climates ' ", in *Journal of Social Psychology*, Vol. 10, 1939, pp. 271-299.

of useful hypotheses since, but which is only now, in the light of objective research, beginning to show its limitations.

Contemporary research aims firstly, therefore, at finding methods of describing the type of leadership in terms of its most characteristic elements. Direct observation, questionnaires, check-lists, interviews, ratings, and role-playing have all been used to obtain systematic information, enabling statistical analysis to be made so as to determine the most important variables. Once these factors are defined it becomes possible to investigate the extent to which they are associated with different types of organisation and with different effects upon the group supervised in terms of satisfaction and productivity.

The studies of leadership carried out by the Ohio State University (at a cost of $1 million) have thrown light on many of these and related questions.[1] In these studies the behaviour of leaders was analysed into two main statistical dimensions, referred to as " consideration " and " initiating structure ", both precisely defined. In spite of these technical advances, however, the evidence thus far permits no general statement that particular leadership styles or organisation structures result in greater productivity.[2] There are certain grounds for asserting, on the other hand, that absenteeism is greater when supervisors show less " consideration ", that grievances are more frequent when supervisors " initiate " more, and that in general employees prefer working under supervisors high in " consideration " and low in " initiating structure ".[3]

If the relationship between the method of supervision and employee performance eludes precise formulation, a common set of values nevertheless pervades much of the current literature. It is generally agreed that authoritarian or paternalistic supervision should be replaced by a consultative, participatory or " reality-centred " form of leadership in which each individual is given the opportunity of exploiting his talents to the fullest and in the way best suited to his personality, so as to facilitate his growth and development as an individual.[4] This theme recurs repeatedly in the psychological literature. It is based essentially upon the hypothesis that participation can help to give work a sense of significance, to combat the negative attitudes and lack of self-fulfilment arising in repetitive work or in the uncritical execution of orders, and to reconcile the needs of the individual with those of the organisation.

The conviction with which these theories are held invites their experimental evaluation and it seems likely that in coming years experiments will be designed to test them. A start has already been made, as for example in the experiment quoted in the section on job attitudes above [5]; in the replications of earlier experiments indicating the value of setting group production goals by means of group discussion [6]; and

[1] Cecil E. GOODE: *Personnel Research Frontiers* (Chicago, Public Personnel Association, 1958).

[2] Carroll L. SHARTLE: *Executive Performance and Leadership* (Englewood Cliffs, N.J., Prentice-Hall, 1956).

[3] Edwin A. FLEISHMAN, Edwin F. HARRIS and Harold E. BURTT: *Leadership and Supervision in Industry* (Ohio State University, Bureau of Educational Research, Monograph No. 33, 1955).

[4] Thomas G. SPATES: " Human Relations: How Far Have We Come? ", in *Management Record*, Vol. 21, No. 3, 1959, pp. 78-80; and ARGYRIS, op. cit., 1959.

[5] MORSE and REIMER, op. cit.

[6] Lois C. LAWRENCE and Patricia CAIN SMITH: " Group Decision and Employee Participation ", in *Journal of Applied Psychology* (Washington, D.C.), Vol. 39, No. 5, 1955, pp. 334-337; and John R. P. FRENCH and others: " An Experiment on Participation in a Norwegian Factory ", in *Human Relations* (London), Vol. 13, No. 1, 1960, pp. 3-19.

by the empirical demonstration that those employees whose jobs provide them with more opportunity to react in a mature way do in fact show more mature behaviour.[1] Clearly further research is required.

Most of the investigation into the subject of management and supervision has taken place in relation to the lower levels in the hierarchy. It is easier in practice to carry out an experiment with a group of 30 foremen than with a group of 30 top managers, who may not view with much enthusiasm a study of themselves. Failure of a study of top managers may moreover prejudice future research. Such studies, however, are evidently of vital importance, in view of the role which senior management undoubtedly plays in determining the character, climate and effectiveness of an organisation. Industrial psychology needs to enlarge its research target so as to include at least some top people.[2]

Relationships between Groups in the Organisation

For the smooth working of an organisation it is important that the different groups comprised in it should work well together. One department should work harmoniously with another and there should be the minimum of friction between, say, office staff and factory workers, or between foremen and time-study men. Relationships between groups of this kind have psychological as well as technical origins and to that extent permit of psychological study. Investigations of this sort have already been mentioned in the section above on job attitudes.

Mention should also be made of the informal groups which, in addition to the formally constituted groupings in an organisation, are found to exist within it. Such informal groups have been extensively studied, in industrial as well as in other contexts, by various techniques including sociometry, group dynamics, case study, and so on, all of which may contribute to the description, analysis and understanding of interpersonal relations and their effect on performance.

No doubt the most crucial area for research into the relationships between groups in the organisation is that of labour-management relations. Psychologists show increasing signs of interest in this field.

It has been suggested that knowledge of social psychology, in particular of social perception, motivation and the dynamics of group behaviour, can play an important part in the understanding and improvement of labour-management relations.[3]

The amount of direct investigation into labour-management relations is, however, quite limited. Recent research includes the study and evaluation of labour-management committee procedures by means of "interaction process analysis", that is a systematic analysis of the contributions made during the course of a meeting, and the subsequent correlation of these contributions with the success of the negotiations.[4] Another approach lies in the statistical determination of the factors to

[1] Chris ARGYRIS : "The Individual and Organisation : an Empirical Test", in *Administrative Science Quarterly* (Ithaca, N.Y.), Vol. 4, No. 2, 1959, pp. 154-167.

[2] Carroll L. SHARTLE : "Blueprinting the Next Ten Years of Industrial Psychology : Top Management, Organisation and Related Areas", in *Personnel Psychology*, Vol. 12, No. 1, 1959, pp. 40-45 ; KAHN, op. cit., 1959 ; and GOODE, op. cit., 1958.

[3] STAGNER, op. cit.

[4] H. A. LANDSBERGER : "Interaction Process Analysis of the Mediation of Labor-Management Disputes", in *Journal of Abnormal and Social Psychology*, Vol. 51, No. 3, 1955, pp. 552-558.

which are related the various elements involved in labour-management relations.[1]

The view has been expressed that psychologists should be able to play a larger role in exploring the circumstances and practices which can lead to more constructive labour-management relations[2], and this is a development which may be expected in the years ahead.

Evaluation of Programmes

The evaluation of training programmes has been discussed above. Similar developments are occurring in respect of other organisational programmes. Thus several attempts have been made to measure the effects of personnel programmes, that is, of personnel management policies and practices. This work can be extended to other fields, for example the evaluation of technical assistance projects, of programmes for the exchange of persons, and of mass media campaigns.[3]

It may be pointed out that evaluation of this kind lies more within the realm of operational research than of psychology. In so far, however, as the programmes are designed to influence people's attitudes or behaviour, the psychologist has a legitimate role to play. There is evidence that this role is gaining increasing recognition.

Concluding Remarks

The marked increase in recent years in the application of psychological methods and techniques to the solution of human problems at work has been attributed in part to the wider recognition now generally given to the human factor. On the one hand values have changed ; labour is differently regarded and management is more ready to acknowledge its social responsibilities. On the other, the inexorable advance of science has led to the hope that it will sooner or later supply the answers through the introduction of orderly system where hitherto only guesswork and subjectivity have prevailed.

At the same time many new developments have taken place in industrial psychology which have extended its practical applications to a wide variety of problems.[4] The scope of the subject has been greatly enlarged ; new methods and techniques have enabled it to be applied with increasing refinement and value.

This application to new problems is to be expected. Many of the problems with which industrial psychologists were originally concerned, for example lighting, noise, monotony, etc., are no longer so actively studied, the findings having been largely accepted and relegated now to the category of " common sense ". Indeed it is sometimes loosely argued that psychology is after all only applied common sense. Yet if it is obvious today that lighting should be adequate or that noise should not be excessive, there is still scope for new research to play its part. The finding, for example, that noisy working conditions increase the frequency of momentary lapses and errors rather than decrease the rate

[1] Ross Stagner, Milton Derber and W. Ellison Chalmers : " The Dimensionality of Union-Management Relations at the Local Level ", in *Journal of Applied Psychology*, Vol. 43, No. 1, 1959, pp. 1-7.

[2] Katzell, op. cit., 1959.

[3] O. Klineberg and others : " Evaluation Techniques ", in *International Social Science Bulletin*, Vol. 7, No. 3, 1955, pp. 345-458.

[4] Tiffin and McCormick, op. cit.

of output, cannot yet be called mere common sense, though it may well become common knowledge in a few years' time. Moreover today's common sense is often shown to be wrong, as witness the widely held belief that high productivity is closely associated with high job satisfaction, a belief whose generality must be seriously questioned in the light of current research.

As psychologists help increasingly with productivity and social problems within industry, so it can be foreseen that the circular process will continue and the demand will increase for even more psychological research.[1] This process has already advanced far in the United States. For example a recent questionnaire study of 40 firms in the aircraft industry has shown that, out of 32 replying, 24 had organised a human factors research programme and six were in the process of doing so, the majority of them employing psychologists for the purpose.[2] The situation is similar in large firms in other major industries.

For other countries, and in particular the developing countries, the question arises to what extent industrial psychology can be introduced and applied. Unlike a new power station, which can be put to work as soon as it is completed, the results of industrial psychology cannot be immediately transposed from one cultural setting to another. One suspects that most of the findings and many of the techniques are valid only or mainly for those groups with whom they were originally developed. On the other hand the basic methods of science remain of universal application. These, when they have been used in countries without previous experience of industrial psychology, have readily indicated their usefulness.[3]

Summarising the situation recently as one of the " grandfathers of industrial psychology ", Professor Viteles states that he is " thoroughly impressed with the accomplishments and potential of industrial psychology ".[4] Similarly Professor Hearnshaw believes that it has a real and distinctive contribution to make, which holds out hope for progress in the future.[5] Certainly the preceding sections indicate a vast field of endeavour. A body of knowledge is being built up, based on respect for the individual and awareness of the dignity of labour, which in this scientific age can be applied to enhance the efficiency and enrich the happiness of mankind.

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[1] LAWSHE, op. cit.

[2] Jack A. KRAFT and James M. VANDERPLAS : " Human Factors Research in the Aircraft Industry ", in *American Psychologist* (Washington, D.C.), Vol. 12, No. 9, 1957, pp. 577-579.

[3] H. LAUGIER (Ed.) : *La promotion humaine dans les pays sous-développés* (Paris, Presses Universitaires de France, 1960).

[4] VITELES, op. cit., 1959.

[5] L. S. HEARNSHAW : " Future Developments in Occupational Psychology ", in *Occupational Psychology*, Vol. 28, No. 1, 1954, pp. 1-8.