A person's movements are different on varying occasions. It is only part of his movement—a part even of each action—which remains constant. The full range of the constant elements will never be present in any one action. A large number of observations are needed, based on a statistical sampling method in order to have sufficient data to analyse. It has proved practicable to obtain this data in the course of a normal business interview.

The development of this work needed a more penetrating investigation into the details of a movement than has usually been the case with other investigations. The present methods have been made possible by the work of Rudolph Laban. The codification of the elements of movement upon which Laban established his notation has made it possible to record the process of variation of at least seven different movement components occurring simultaneously in the course of one action.

Movement analysis reveals those capabilities which can be expressed spontaneously. A person who can present himself or exercise authority spontaneously would not have to depend upon 'props' such as the correct dress or a conferred status. A distinction can be made between those whose authority is fixed, dependent upon a static set of circumstances, and who would have little range of the relevant movement variation, and those whose authority is spontaneous and adaptable, and who would have a good range of variation.

If a person is asked to perform a number of actions unassociated with any particular purpose and built up from within his range of constant elements, he enjoys the movement. If he is asked to perform actions built up from outside the range, he invariably feels awkward and unco-ordinated. Many experiments with people of many different vocations have shown this to be true. The range of constant elements is the range within which a person 'feels right'.

That there is a relationship between mental functioning and physical movement is implied in the development of psychosomatic medicine during the course of the present century.

The application of this work within industry has been on the basis that if a person is able to work within a set of conditions by meeting the needs from within his range of constant elements (that is to say, the range within which he 'feels right'), then he has aptitude for that set of conditions. This gives a precise definition to what is meant by 'aptitude', a word which is often used loosely as a synonym for ability, potentiality, capacity or even intelligence.

In order to make an 'aptitude assessment', it is necessary to specify the particular set of conditions, and this is done according to current techniques of job evaluation, differentiating between those aspects of the job which can be satisfied through purely technical competence and those aspects which can be met effectively only through the appropriate aptitude. It is obvious, but often little considered, that a man of a certain technical competence may be able to apply his skill effectively in one set of conditions and ineffectively in another. The aptitude assessment which derives from the analysis of constant elements in movement is a measure of a person's readiness to apply his technical skills or knowledge within a specified set of conditions.

Whereas much investigation of the 'significant response' type seeks to classify phenomena, reduces differences and generalizes, the methods of aptitude assessment based on movement observation follow a contrasting procedure. There is no classification of phenomena, differences are magnified, both within the individual and the conditions, and the resultant assessment is a particular yardstick, applying only within specified conditions. The procedure brings forward the exceptional, distinctive 'man of the moment', as against the average, conformist 'type for the job'.

The procedure is not itself exceptional and is akin to existing practices. An appreciation of the techniques is easily gained during practical study. A number of intensive two-week courses have successfully been given to executives wishing to incorporate the techniques within their own company practices.

T. H. HAWKINS

SCOPE FOR EXPANDING PULP AND BOARD INDUSTRIES IN BRITAIN

THE conclusions and recommendations of two reports prepared by Sandwell and Co., Ltd., on pulp and board mills in Great Britain (see *Nature*, March 26, p. 894) were used as the basis of a discussion organized by the Society of Foresters of Great Britain and held during November of last year. This Society is concerned with "the knowledge of technical forestry in all its aspects" and it was fitting that on this, the first, of its ventures into special discussion meetings it decided to examine the implications of the Sandwell reports. The proceedings of this meeting have now been published as a supplement to the Society's journal, *Forestry*, which is available to non-members*. The programme was designed to give a balanced picture of the problems involved in development and the individual views of industrialists,

technologists, and competitors for the wooden raw material. The growers' point of view was discussed under forest management considerations and the whole idea was subjected to the economist's evaluation, and a careful summing up.

As the Society of Foresters of Great Britain included few industrialists in its membership, invitations were sent to leading personalities in the industries concerned. Dr. T. H. Frankel, of Sudbrook Pulp Mill, Ltd., a subsidiary of Wiggins Teape and Co., Ltd., said that in his view the Sandwell reports implied that the smaller the mill the less efficient it would be. In exploring the possibility of setting up a pulp mill in the Scottish Highlands, he stressed the unlikelihood of a newsprint mill being sited in Britain. He examined some of the technical and economic problems of the industry and urged that the criterion for growers of timber should be to produce the maximum bone-dry weight, bark free, per acre per

* The Development of Pulp and Particle Board Industries and Their Effect on Forest Management. Pp. 68. (Oxford University Press, 1960.) 5s.

annum. The development of the chipboard industry was reviewed by Mr. F. C. Lynam, of Aircscrew Co. and Jigwood Ltd., who criticized the Sandwell Board Mill Survey because it did not do justice to the possibilities of development. Its most important conclusion, he believes, is that even in a large plant the economic price would have to be about £11-£12 per ton of bone-dry wood. Mr. B. J. Rendle, of the Forest Products Research Laboratory, and Dr. L. Chalk, of the Department of Forestry, University of Oxford, explained the anatomical criteria for industrial use and the problem of 'juvenile' wood, respectively. If it were known what the pulp mills would like to have, this could be taken into account in plans for improving trees by selection and breeding and by forest management. The problem of 'juvenile wood' is often over-simplified, especially by the assumption that it is a matter of age.

The requirements for the coal mining industry were reviewed by Mr. B. C. Hollingsworth, of the National Coal Board, who explained that the Board has followed a policy of purchasing home-grown timber, of which it has greatly increased its consumption since 1947 and still has room for increased softwood demand. Rising production from thinnings may well meet the needs of the pulp and of the coal industries, and the arrival of a new market for the raw material would solve problems and confer benefits on all consumers as well as on producers. The prospects of greater demand from the furniture industry were explored by Mr. J. P. Pritchard, of the Furniture Development Council. In his opinion there are several ways in which growers and chipboard manufacturers could help to raise the demand for their products. The industry was progressive and expanding, like the size of the firm, thus making possible greater expenditure on design and development. As a consultant in wood technology, Dr. S. E. Wilson, who is well placed to examine the needs for housing and packing, declared that the principal aim of domestic forests in Britain has been, and still was, to supplant the imported deals, battens and boards used mainly in the building and packaging trades.

The Forestry Commission's director of forestry for England, Mr. G. B. Ryle, questioned the view that in Britain we should be justified in running our forests primarily for the pulp and board industries. Forest management, he said, implied three things in

this context: the right trees for the industry; the optimum rate of growth and right specifications and operational efficiency.

The evaluation of the economists was provided by Mr. G. W. Troup, of Albert E. Reed and Co., Ltd. He said that he could not give the final answers on the prospects for small-scale pulping in Britain—about which the Sandwell reports had been rather discouraging—but he did suggest some of the questions which remained for investigation, for example, on such matters as roundwood yields and price and costs trends. One of the interesting points emphasized in the economics discussion was that the 'Outer Seven' proposals have no bearing on pulp mills, although they will affect board mills because the existing tariff protection will be gradually reduced over, at the most, ten years. This will almost certainly lead to greater integration in the pulp and paper and board industries, for example, in the Scandinavian countries, and thus add to the competitive power of imported supplies.

Many searching questions and observations were a feature of the seven discussions which followed the main papers, and many leading authorities among the members and guests of the Society of Foresters were asked to open the discussions in a formal and thorough fashion. It was held by Mr. K. N. Rankin, of the Economic Forestry Group, when he summed up what had emerged from the meeting, that there is a clear need for all to see themselves as one industry—growers, saw-millers, and processors. There is need for over-all planning as one industry and for the utmost efficiency in all sectors in order to be competitive by world standards. The objects of the planning should be 100 per cent utilization of forest products and the highest return on the capital employed in the industry. With these objectives in mind, Mr. Rankin went on to suggest what kind of pattern production should follow. Pulp and paper demand is rising at 7 per cent per annum and if supplies cannot keep pace there is a fair prospect of rising prices. The directions in which growers could more satisfactorily produce what is wanted was also reviewed in some detail. Mr. Rankin ended with the challenging questions: Why should we not export more timber products and why should we not have vertical as well as horizontal integration in the industry?

J. J. MACGREGOR

ATOMIC ENERGY RESEARCH IN DENMARK

THE third annual report of the Danish Atomic Energy Commission describes the activities of the organization during the period April 1, 1958–March 31, 1959 (pp. 85. Copenhagen: Danish Atomic Energy Commission, 1959). It deals with the erection of the Risø Research Establishment; the reactors DR1, DR2 and DR3; the work of the six departments of the Establishment; international co-operation in the peaceful uses of atomic energy through the International Atomic Energy Agency, the Organization for European Economic Co-operation and the European Atomic Energy Society; and includes the texts of the addresses delivered by Mr. Viggo Kampmann, Minister for Finance, and by Prof. Neils Bohr, the president of the Commission, at the inauguration of the Establishment on June 6, 1958.

During the period under review the Commission met seven times and its executive committee thirty-three times. Prof. Neils Bohr continued as chairman of the Commission, with Dr. H. P. Christenson as vice-chairman, and H. H. Koch as chairman of the executive committee. The total staff on March 31, 1959, numbered 385, of which 214 were employed in the technical and scientific division and distributed over the six departments. The secretariat, headed by the chief of Commission secretariat, had a staff of twenty-six, including three law and one economics graduates. The office of the Commission was at the Christiansborg Palace, but the secretariat had a subsidiary office at Risø.

The physics department of the Establishment consists of the physics laboratory, the meteorology